

**THE RELATIONSHIP OF ILLNESS BELIEFS, MASTERY STRIVINGS, AND
EMOTION REGULATION PROCESSES TO DIABETES OUTCOMES**

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Declaration

This thesis is my own work and has been composed by me. It has not been submitted for any other degree, postgraduate diploma or postgraduate qualification.

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Abstract

Objectives: To evaluate the relative contribution of illness beliefs, mastery strivings and emotion regulation processes to the prediction of outcomes in diabetes (diabetes distress, self care behaviour, and HbA1c scores).

Design and Methods: Ninety six adults with type 1 or type 2 diabetes were assessed on measures of illness beliefs, mastery strivings, and emotion regulation processes in a cross sectional design to determine their predictive relationship to diabetes distress, self care behaviour, and blood sugar levels (the latter was measured at baseline and at 6 months follow up to allow cross sectional and longitudinal comparisons).

Results: When comparing illness beliefs with emotion regulation processes, illness beliefs (control; seriousness) and a specific emotion regulation process (rumination) predicted *diabetes distress*. Illness beliefs (particularly control and seriousness) partially mediated the association between emotional rumination and diabetes distress. When comparing mastery strivings with illness beliefs, diabetes distress was predicted by a particular mastery striving (perfectionism) and specific illness beliefs (control; seriousness). Illness beliefs (control and seriousness) mediated the association between specific mastery variables (Type A and rational coping) and diabetes distress.

In a comparative evaluation of mastery strivings and illness beliefs as potential predictors of *self care behaviours*, rational coping (a mastery striving) predicted general diet in the final model. Perceived control partially mediated the effect of rational coping on general diet. None of the mastery striving variables or illness beliefs predicted exercise in the final model (rational coping, while predictive at step two, dissolved at step three). Finally, perceived effectiveness of treatment (illness belief) predicted blood monitoring in the final model. Perceived effectiveness of treatment mediated the effects of Type A on blood monitoring behaviour.

When comparing self care behaviours with psychophysiological variables in relation to *blood sugar levels*, none of the components of either grouping predicted HbA1c scores at baseline. However, at 6 months follow-up, one specific psychophysiological variable - emotional inhibition - predicted blood sugar levels. As with baseline HbA1c scores, none of the self care variables were predictive of HbA1c scores at follow up.

Conclusion: Illness beliefs possibly mediate the effects of more generic personality characteristics - mastery strivings and emotional regulation processes - on diabetes outcomes (emotional adjustment, self care behaviour). Moreover, an emotion regulation process (inhibition) directly mediated changes in blood sugar levels. The therapeutic implications of these findings are discussed within the context of relevant psychological theories.

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CHAPTER 1
INTRODUCTION

1. INTRODUCTION

Diabetes, with its multiple psychological and behavioural demands, can be viewed as a chronic stressor. As such, it requires certain personal capabilities and resources to cope with the pressures and strains involved over the longer term. At the heart of classical models of stress and coping (Lazarus & Folkman, 1984) are the constructs of appraisal and coping. The present research is concerned with investigating appraisal and coping dimensions for their relevance to diabetes adaptation. The literature review will deal with these core concepts respectively. The review does not aim to provide an exhaustive coverage of research studies in the areas identified. Rather, exemplar studies were selected to illustrate, and provide empirical support for, theoretical perspectives considered relevant to an understanding of psychological adaptation in diabetes.

1.1 Cognitive Representations of Illness

Within mental health, cognitive models posit an appraisal mediating mechanism between events and subsequent emotional reactions. In simple terms, the model proposes that it is not events themselves that give rise to emotional distress but rather the meaning attached to the event which dictates the emotional response (Beck et al, 1979, 1989). To understand negative emotional reactions, the model proposes a biased or partisan appraisal system laden with thinking distortions i.e. misinterpretations, catastrophizing tendencies etc. In extrapolating the model to illness behaviour, it is conceivable that adaptation to illness may well be mediated by specific cognitive appraisals. A commonality across cognitive models of dysfunctional illness behaviour is the notion of individuals as active information processors constructing an understanding of one's illness. Adopting the concept of mediation, emotional reactions to illness or, indeed, coping or self-care behaviour should flow directly from one's personal understanding of one's illness.

Such explanatory models have been applied to diverse illness presentations. Sharpe (1996), for example, highlights how dysfunctional cognitions in chronic fatigue conditions can hinder recovery through the promotion of unhelpful self care

efforts. In health anxiety, the cognitive model gives primacy to the misinterpretation of commonplace physical sensations e.g. autonomic arousal. (Salkovskis & Warrick, 1986) 'Mental catastrophizing' is posited as central to the severity of the emotional reaction. That is, a sinister interpretation is placed on a benign symptom which, if repeatedly activated over time, escalates into obsessive health ruminations/preoccupations. Experimental evidence affirms this tendency to misinterpret ordinary bodily sensations in patients prone to health anxiety (Salkovskis & Clark, 1993). In chronic pain, the cognitive model would postulate that the meaning with which the pain is invested plays a large role in shaping behavioural patterns adopted and emotions experienced (Turk, Meichenbaum & Genest, 1983). For example, an acute sense of helplessness in the face of severe pain may foster a hopeless attitude, culminating in a loss of motivation to manage pain levels. On the other hand, perceptions that pain can be controlled can increase pain tolerance. Bowers (1968) demonstrated that subjects tolerated more pain when they were in a position to turn off the pain stimulus (which they chose, on occasion, not to do).

Studies concerned with the cognitive factors influencing health behaviours have generated a number of social cognitive models eg. the Health Belief Model (Rosenstock, 1974), the Theory of Planned Behaviour (Ajzen, 1991), Protection Motivation Theory (Rogers, 1983), Self-efficacy (Bandura, 1977), and Social Regulation Theory. (Leventhal et al, 1980). Core cognitive dimensions across these models include perceptions of threat – perceived illness susceptibility and severity (HBM, PMT, SRT), perceived costs and benefits of health behaviours (HBM, PMT), and perceived control of illness/self efficacy, (TPB, PMT, SRT, Self-efficacy). As an example, Self Regulation Theory proposes that the individual perception of the threat posed by illness determines, in large measure, the degree of motivation to address health concerns. Existing knowledge and beliefs about illness are considered to interact with the appraisal of health related information. Within this model, the cognitive representation of the illness has five main components (a) identity (the name and symptom cluster of the condition), (b) time line (is the condition cyclical, acute, recurrent, chronic etc), (c) causes (personal beliefs regarding the underlying causative factors involved), (d) consequences (expectancies regarding the impact of the condition) and (e) cure/control (beliefs concerning the controllability or "curability" of the illness). This illness representation maps on to an action component. That is to

say, active coping efforts flow logically from the personal model or representation of the illness.

Self-regulation theory has been used to understand a range of illness behaviours from self-adherence to coping with chronic illness. In diabetes, research has clarified the important dimensions of the personal meaning of illness for the individual. For example, Hampsen, Glasgow & Toobert (1990) in a study of the personal models of illness held by diabetic patients, identified four composite components informing their understanding of the illness (cause, symptoms, treatment and seriousness). Personal models incorporate the representation of the illness, knowledge or understanding, attitudes, subjective experiences, and associated feelings (Petri & Weinman, 1997). From the perspective of self-regulation theory, illness beliefs are assumed to play an important role in shaping a person's subjective reaction to the health threat involved and any health-related behaviour (Leventhal, Leventhal & Contrada, 1998). The personal models approach, while consistent with the broad theoretical framework of social cognition models, is distinctive by its empirical grounding emanating from clinical studies of patients.

In diabetes, specific features of personal models (illness beliefs) in both adults and adolescents have been shown to be concurrently and prospectively related to self care outcomes (Hampsen, Glasgow & Foster, 1995; Skinner & Hampsen, 1998). In particular, beliefs about the effectiveness of diabetes treatment have been consistently associated with dietary self-management in research. Personal models of treatment effectiveness map on to Leventhal's illness representations of the control/care components respectively. Further, beliefs about one's perceived personal control over diabetes have also been postulated as mediating treatment outcomes. Bradley et al (1990) demonstrated cross sectional associations between personal control and improved treatment satisfaction, well being and glycaemic control. Hampsen, Glasgow, & Strycker (2000) demonstrated, in an adult sample of diabetic patients, that those with greater perceived control had lower blood sugar levels. As past levels of blood sugar levels were controlled for in this study, there was an implication that perceived control was rooted in underlying cognitive structures rather than historical blood sugar levels.

1.1.1. Illness Beliefs & Cognitive Schemas

Social cognitive models of illness behaviours have emphasized the role of beliefs about the illness in particular in the absence of any concern with broader belief systems characterising the individual's relationship to himself and the world. Williams (1997) proposed a new cognitive model of dysfunctional illness behaviour which embraces nonillness beliefs in addition to more specific illness representations. He gives primacy to the net interaction of these sets of beliefs which, in turn, shape the unique meaning of the illness for that person. Regarding core belief systems unrelated to illness, the schema concept has been given great emphasis in the cognitive model of depression (Beck et al, 1979). Described as relatively stable enduring cognitive representations which ensure a consistency in response across similar types of events, such underlying structures are hypothesized to fundamentally shape both emotional states and behavioural responses. William's model is antedated by others who have considered the role of beliefs other than illness beliefs in dysfunctional illness behaviour (in particular beliefs about the self and others). As an example, Taylor (1983) described how the need for mastery/control may distort illness beliefs to maintain self-esteem and hope for the future. In his cognitive adaptation model of illness, the process of adjustment is centred on three themes – a search for meaning, an attempt to gain a sense of mastery or control of the illness, and the need to restore self esteem. Meaning refers to a persons understanding of the implications an illness has for themselves, their relationships with others, their priorities and future goals. An individual who values, finds meaning in, and thereby strives for mastery experiences in life (competency/control schemas), may develop positive illusions of control in an illness context which may have relative degrees of uncontrollability. This would be a case of an illness belief being honed to accord with an underlying self defining belief system. In other words, schematic nonillness beliefs supersede reality considerations to create conscious illness beliefs consistent with underlying schemas. Alternatively, a situation may arise whereby, in the face of incontrovertible evidence of illness uncontrollability, health concerns are denied to maintain illusions of control/mastery in life generally. In other words, the breaching of core beliefs evokes a defensive reaction which reinstates the status quo but at a

health cost to the individual (demotivation and disengagement from health self care behaviours).

Fournier et al (2002), in a comparison study of three chronic diseases (diabetes, rheumatoid arthritis, and multiple arthritis) found that optimistic control beliefs (positive outcome expectations, positive efficacy expectations, and positive unrealistic thinking) associated with the illness were emotionally adaptive when the disease aspects were to a large extent controllable; with lesser degrees of disease controllability, however, optimistic beliefs about control were less beneficial to emotional adjustment. Similarly, in a study of 92 patients with rheumatoid arthritis, Affleck et al (1987) found a negative relationship between illusory beliefs of illness control and emotional adjustment in those with advanced or worsening symptoms, suggesting that failure to relinquish control beliefs in the face of evidence to the contrary may be emotionally distressing. The authors speculated that preoccupation with controllability factors possibly derived from an inability to exercise effective control over the illness. Within the context of diabetes, unyielding rigid needs for mastery and control (reflecting the operation of specific self schemas) could, in interaction with periodically erratic or uncontrollable blood sugar levels, lead to extreme feelings of failure and hopelessness about the prospect of controlling the condition. Another individual, struggling with the same “moving target” (erratic blood sugar levels) but in the context of more moderate, flexible self schemas may retain some belief in the possibility of controlling the illness which, in turn, may lead to a sustaining of self care efforts. Similarly, beliefs about others may also have an impact on illness behaviour. Underlying rigid belief systems (‘others can never be pleased’, for example,) could impair trust in health professionals, fuel resentment , and ultimately undermine self confidence and motivation to address diabetes self care behaviours. Thus, beliefs about the self, others and the world, may, in combination with more specific illness representations, have a strong bearing on illness behaviour. Both SRT and the personal models approach are limited as clinical models by the peripheral role accorded to nonillness beliefs (beliefs about the self and others). One would, according to Williams, anticipate an interactional effect between beliefs about the self /others and illness beliefs (perceived controllability, perceived seriousness, and perceived treatment effectiveness, for example). According to Leventhal &

Cameron (1987) characteristic representations of the self, and illness representations are interrelated, with one colouring, and, in turn, being coloured by, the other

In Williams' cognitive model of dysfunction illness behaviour (an advance on social cognitive models which give primacy to illness beliefs), changes to the self schema may be necessary to effect changes in the illness representation and, thus, illness behaviours. For example, in diabetes, the core belief "I have to be perfect" may give rise to lack of confidence in striving for diabetes control given that perfect control is unattainable. This, in turn, could result in avoidance of coping efforts to minimize any sense of failure arising from unattainable goals. From a clinical perspective, adjustment to diabetes in this context may be best facilitated by challenging fundamental needs for perfection before beliefs about personal control of the condition can be modified. In Williams' model, self schemas are thus afforded a central role as a composite of core beliefs interacting with the personal models of the illness. As stated above, self schemas can be considered enduring consistent beliefs about how individuals perceive themselves, their relationships with others and the world in which they live. Such core beliefs can be adaptive or unhelpful, flexible or rigid, dormant or continuously active. They may reflect themes concerning the need for mastery, competency, achievement, control, low self worth, personal vulnerability etc. These fundamental evaluative beliefs, may, in turn, shape the interpretation of a specific illness. Cognition, emotion, and behaviour are thus deemed to be interrelated in this model.

1.1.2. Interacting Cognitive Subsystems Approach

Beck's cognitive model, as described above, places conscious meaning at the heart of his explanatory framework when contemplating emotion production. The primary concern is with stream-of-consciousness thinking somewhere within the range of personal awareness. This rather narrow treatment of cognition as consciously experienced thoughts and images is in contrast to the applied cognitive science position which situates the majority of cognitive processing at more implicit or remote levels of awareness. For example, in clinical settings, it is commonly observed that people report emotional states without being able to identify any commensurate conscious thoughts to account for their feelings. Moreover, therapeutic efforts

targeting purely conscious thinking are often ineffective in changing the emotional response. Thus, cognition defined exclusively as conscious ideational activity with verbal or pictorial content appears to have shortcomings as an explanatory construct when trying to comprehensively understand the link between cognition and emotion. Mindful of the problems encountered by Beck's cognitive model, Teasdale & Barnard (1991,1993) expanded the Interacting Cognitive Subsystems framework (a framework shaped by empirical findings in cognitive science to account for all forms of information processing) to further illuminate the complex interaction of cognition and emotion (Barnard & Teasdale, 1991; Teasdale & Barnard, 1993).

Within the interactive cognitive subsystems approach, there are two kinds of meaning – a specific and a more holistic intuitive level of meaning (Teasdale et al, 1993). In contrast to more traditional cognitive models which emphasize specific meaning content in propositional form, ICS suggests that holistic implicit meanings are the primary determinants of emotion production. This implicit knowledge is rooted in schematic models of experience, that is, conceptual representations of interrelationships between generic features of experience - high level recurring regularities that have been extracted from life's experiences. Representation at this level is at a high level of abstraction, and is generic and thematic in content. The analogy between a sentence and a poem is illustrative. A sentence conveys specific meanings directly related to particular arrangements of letters, phonemes and words. The meaning is clear and unequivocal and is a direct function of the sequencing of the constituent elements. A poem, on the other hand, contains holistic meanings that are not reducible to the specific meaning content: rather, the sequencing of sentences together with sensory contributions from visual imagery, sounds of the words, rhythms employed evoke transcendent 'felt senses' or higher order meanings which do not map directly onto language.

According to ICS, more specific meaning levels may only affect emotional responses insofar as they feed into, and contribute to the regeneration of affect–schematic models (holistic meanings). Accordingly, while specific beliefs (eg. illness representations) can be therapeutically reshaped to effect change in the parent schematic model, it is holistic rather than specific propositional meanings that should be the primary focus of change. Subjectively, such implicit meaning is characterized

by experiential ‘senses’ or feelings with implicit meaning content: ‘on top of things’, ‘in control’, ‘hopelessness’. In diabetes, physiological factors beyond a persons control often intervene to undermine self care efforts and ensure that personal standards of performance may not be met. As a medical condition, it is thus tailor-made to activate dysfunctional schematic models (sense of helplessness, loss of control, failure) in those individuals whose predominant motivational schemas incorporate achievement/control/ perfectionist strivings. In other words, the immediate felt sense (‘out of control’ for example), although projected on to a specific situation in the present (loss of diabetes control), possibly reflects a generic theme which is integral to the personality structure. One implication is that such generic parent schematic models should themselves be addressed to attenuate their disruptive effects in specific situations i.e. diabetes self management.

As earlier stated, a distinctive emphasis at the heart of Williams (1997) dysfunctional illness behaviour model is the interaction between the beliefs about the meaning of the illness (the illness representation) and beliefs about self, others, and the world. With regard to the interaction between this illness belief triad (beliefs about the illness; beliefs about the self, others, and the world they live in), and other nonillness related beliefs, there are multiple feedback loops which ensures that information processing at each stage influences the processing at the next stage. This proposition about the interaction between multiple belief systems as the crucial mediating mechanism is consistent with the ICS approach. In highlighting the importance of the interaction effect between different levels of meaning or belief, Williams is, implicitly, invoking, an appraisal pattern which transcends the specifics of the immediate situation (eg. the illness situation) to partially reflect more generic holistic cognitive themes abstracted from life’s recurring regularities. If thematic content is prepotent (ICS position), appraisals regarding specific contemporary situations may thus be primarily shaped by the ‘undifferentiated schematic residue’ of multiple congruent historical experiences. Williams model (1997) and the ICS perspective are similar in their consideration of core cognitive structures as ‘shapers’ of context specific meanings. However, while Williams proposes an interaction effect between sets of prepositional beliefs at different levels of generality and awareness, (illness versus non-illness explicit beliefs), ICS details a more fundamental undifferentiated implicit ‘felt sense’ abstracted from life’s recurring regularities as the immediate

precursor to emotional reactions. In other words, an implicit thematic meaning level which speaks to the history of regularities in the individuals past experiences and is beyond the immediate 'givens' of the current situation.

Consistent with position statements by Williams (1997) regarding the need to embed our understanding of dysfunctional illness behaviour within the context of beliefs about the self, others, and the illness, clinical experience of diabetes-related adjustment problems often suggests that underlying schemas and related reaction tendencies need to be addressed. Much of the diabetes research literature, however, tends to address the problems of diabetes management independently of these less proximal 'person' variables (Glasgow, 1995). Such models, as described above, provide an opportunity to test specific hypotheses and predictions. In particular, there is a direct implication that more distal self schemas have an impact on behavioural and emotional outcomes and that such effects may be mediated by illness beliefs. The clinical implication is that therapeutic interventions may have to address multiple levels of belief systems for optimal clinical outcomes.

1.2. Emotional Rumination, Cognitive Biases, and Distress

The strong association between diabetes and depression has been repeatedly demonstrated (as has the link between chronic illness in general and depression). Peyrot & Rubin (1997) reported that 41.3 % of diabetes sufferers have significantly elevated levels of depressive symptoms. Lustman et al (1997) reported that levels of diagnosable depression in diabetes patients are about three times the estimated prevalence in the general population and that it is associated with poor glycaemic control and an increased risk for medical complications. Moreover, the depressive course may be chronic and severe in diabetes, with an average of four depressive episodes over a five year period (Lustman et al, 1996). Indeed, depression and diabetes may be mutually antagonistic at both the neuroendocrine and psychological levels. Hormonal dysregulation associated with depression may aggravate glycaemic dysregulation (and vice versa). Equally, feelings of helplessness and hopelessness associated with depression may grossly disrupt self care behaviours, resulting in worse metabolic control, a progressive sense of powerlessness, and possible deepening of depression (Rubin & Peyrot, 1994).

Similarly, although research on the association between anxiety and diabetes is relatively sparse, one study (Peyrot & Rubin, 1997) found that individuals with diabetes may suffer from anxiety disorders as much as they do of depression and certainly with much higher rates than that found in the general population. In this particular study of 600 individuals, the presence of two or more long term complications was the only diabetes related predictor of significant anxiety symptoms. Anxiety symptoms typically reflect an exaggerated emotional response to ordinary sources of threat in a person's life. In diabetes, however, fear and tension can be constant due to the ever present threat of hypoglycaemia, long term complications, and the day to day stresses of managing a difficult condition. Anxiety and depression are often comorbid conditions and, indeed, there is an area of symptom overlap across these disorders. An established common factor central to the onset and maintenance of these related symptoms is the process of negative rumination.

Research has demonstrated an interplay between emotion regulation processes and cognition such that a proneness to excessive rumination under stress frequently gives way to increased cognitive biases and related mood disturbance. The link between rumination and depression is well established (Nolen-Hoeksema, 1991) as is the association between detached mindfulness and the curtailment of the ruminative process (Ramel et al, 2004). Further, empirical studies of cognitive theories of depression have identified negative cognitive styles and negative rumination secondary to depressed mood as risk factors for depressive episodes. Robinson & Alloy (2003) in a sample of 148 initially non-depressed graduates, found that the interaction of negative cognitive styles and stress reactive rumination predicted the prospective onset, number, and duration, of depressive and hopelessness episodes. Such interactions were not replicated when other measures of trait self-focus and depressive rumination were used instead of stress reactive rumination. In this particular study, rumination was described as a tendency to focus on maladaptive self-referential thoughts following a stressful event. Lavender & Watkins, E (2004) demonstrated that rumination exacerbates negative cognitive biases in depression, resulting, for example, in greater negative future thinking in depressed patients.

One implication of this association is that a tendency toward rumination may constitute the more primary etiological factor underpinning emotional distress with cognitive biases/beliefs operating as mediating factors. This is consistent with the ICS position (Barnard & Teasdale, 1993) which considers implicit felt senses - conceptually laden experiences – to be prepotent in emotion production. Compulsive negative ruminations are frequently accompanied by a near preverbal sense of being mentally ‘out of control’ – a feeling that thinking is unnaturally constrained, inflexible, unproductive and ultimately distressing. Traversing repeatedly the same ‘cognitive grooves’ may well be the very mechanism which maintains, and intensifies such cognitive rigidity. The gradual consolidation of negative belief systems may ultimately be secondary conscious derivatives of this implicit ‘loss of control’ schema associated with ruminative thinking.

In addition, a proneness to rumination under stress may act as an impediment to rational problem solving in that, by its very nature, worrying ruminations are anathema to constructive action. Rather, they constitute an indeterminate process entailing a largely passive absorption with a person’s own thought processes. In diabetes, the capacity for self-care behaviour is predicated on a capacity for rational problem solving in that an understanding of the relationship between key variables, namely, food intake, exercise requirements, insulin dosage, and blood sugar levels is required to facilitate trial and error learning which itself acts as a feedback loop which further refines understanding of the relationships involved. A proneness toward excessive emotional rumination could be inimical to this process. Discrepancies in goal progress combined with an inability to disengage from thwarted goals (perfectionist standards) may typically give rise to a prolonged ruminative tendency with related depressive affect (Martin & Tesser, 1996). Within this perspective, those who experience more frequent or salient discrepancies between ideal and actual outcomes may manifest a greater tendency to ruminate.

Past research on stress and ill health has mainly considered levels of exposure to life events. However, as the range of responses to similar situations is many and varied, it is suggested that individual differences in response style may be a much stronger determinant of the stress response. A tendency toward emotional rumination may constitute one such moderating individual difference in stress reactivity.

1.3. Emotion Inhibition & Distress

According to Traue & Deighton (2000), emotional inhibition (a 'holding back' or suppressing tendency) is a maladaptive interaction pattern typically characterised by reduced spontaneous expression, unemotional language, and social apprehension. It refers generically to the incomplete processing of emotional stress when bodily changes (physiological, endocrinological, or immunological) are triggered by the stressors in question and the natural cognitive, emotional and behavioural processes are distorted. Subjective experience and spontaneous expression of emotions and action tendencies are constrained, resulting in inner conflict, psychological distress and distorted interpersonal dynamics. In essence, it is a form of defensive relating. In suppressive inhibition, emotional arousal is recognised by the person but spontaneous expressive and cognitive behaviours are automatically suppressed. Cultural conditioning may help to shape this coping strategy. For example, if individuals risk emotional expression under stressful circumstances, negative reinforcement from significant others may initiate a learning history which effects a gradual decrease in spontaneous expressiveness. This can be clearly seen in gender differences in emotional expression. Males are programmed from an early age to hide their vulnerability to maintain the stereotypical male self image. As a result, they can be greatly incapacitated in the work of emotional disclosure and may, as a result, experience considerable difficulties in intimate personal relationships. Women, on the other hand, have a natural penchant for feeling expression; as a result, their emotional bonds are often deeper and more enduring. Historical conditioning condones and encourages the expression of vulnerability in women, with an unstated subtext that the 'harder' emotions (anger, drive to succeed etc) belong firmly in the male dominion.

1.3.1. Psychological Precursors of Inhibition

From an evolutionary point of view, stress hormones are essential for mobilizing energy under stress (a heightened sense of threat). In the present age, many sources of threat comprise the many obvious and not so obvious social-emotional dangers to our self esteem in a world which continually agitates for mastery, achievement, success and conformity in the realms of work, family, and relationships. Such dangers are often intensified by pre-existing vulnerabilities rooted in dysfunctional childhood

attachments. Fears/conflicts over emotional expression may reflect unconscious expectations of retaliation from others based on relationship experiences in the formative years or possibly in later life. In diabetes research, the DAWN report (Albert, 2002) highlights the importance of family/social support in emotional adjustment and metabolic control. Tendencies toward nagging, criticism, etc by a partner typically undermine emotional adjustment and diabetes control. Social environments of this type, characterized by an absence of 'emotional disclosure safety' (fear of retaliation), may serve to fossilize emotional inhibitory tendencies. Devoid of the capacity for the spontaneous and natural expression of feelings, internal psycho-physiological tension is thus regularly created which, in turn, effects chronic strain at the bodily level. Thus, emotional regulation processes such as inhibition and rumination appear to constitute psychological survival mechanisms which partially protect against the threat of injuries to the self in an emotionally unsafe world. In inhibition, the self remains in hiding; in rumination, the person is 'going it alone' in his perseverative mentalizing efforts to solve difficulties without the aid of another. That they are associated but distinct psychological processes is supported by Rogers (1997) finding that they are statistically related but orthogonal constructs when operationally defined. Introspective observation often indicates that one ruminates more in so far as one inhibits expression of feelings to others (inhibited expression invites lack of resolution of conflictual feelings which, in turn, may fuel the unrelenting pressure to engage in solipsistic unproductive ruminating).

Research supports the importance of emotional expression in psychological health (Paez et al., 1999). In diabetes research, type 1 patients who underwent written disclosure assignments demonstrated less depressive symptoms and fewer incidence of physical illness (Boder, 2004). Self-concealment (a variant of emotional inhibition) has been shown to be related to psychological distress (Cepeda-Benito & Short, 1998), anxiety, and depression (Larson & Chastain, 1990). In a study of perfectionism involving 116 undergraduate women, path analysis indicated that a tendency to conceal negative personal information (self concealment) has been shown to mediate the relationship between maladaptive perfectionism and psychological distress (Kawamura & Frost, 2004). In keeping with this finding, the frequently documented phenomenon of 'bogus logs' of blood sugar readings by diabetes sufferers may reflect a fear of disclosure associated with unrealistic expectations

either within the patient or the clinician. Greenberg & Lepore (2004) suggest that emotional disclosure helps people to tolerate and regulate negative feeling states through habituation and cognitive reappraisal of emotions. Moreover, the need for social sharing of emotional states may reflect a strong urge for people to “reimmerse themselves in the social consensus” (Rime et al, 2004, p.40). It accords with basic tenets of attachment theory (Bowlby, 1969) concerning a child's need for proximity and connection with a parent when stressed. Emotional disclosure in adulthood serves a similar function by reinstating ‘felt security’ through increased personal intimacy with another and the emotional containment that this affords. Any tendency toward emotional inhibition, in maintaining social disconnection at times of heightened vulnerability, will incubate negative feeling states through the intensification and distortion of negative thinking patterns/appraisals. The absence of ‘corrective feedback’ from others when the self is concealed in this way may also be contributory. In diabetes, the sense of being different, the perceived social stigma, the perceived lack of understanding of others, the underlying fear of complications, and perceived difficulties in controlling the condition all conspire to heighten the sense of personal distress and alienation from the mainstream social world. Such negative illness appraisals, which are often the immediate conscious precursors of distress states in diabetes, may thus be a function of emotional inhibitory tendencies within the personality.

1.4. Coping in Diabetes

Coping style refers to the ways that people typically respond to challenging or stressful situations in their lives. For some researchers, coping behaviour is thought to be consistent across situations, whereas for others, it is very much determined by situational specifics. Lazarus (1984) in his transactional model of stress and coping, attended to both the process of threat appraisal and the perceived resources to deal with the level of threat involved. Such a model is useful in understanding people’s adaptation to illness and disease. In Lazarus’ model, coping responses are broadly categorized as problem focussed or emotional focussed strategies. In the latter, attention is directed to a person’s inner emotional/ psychological reaction as the key ingredient which mediates coping. For example, disclosing emotions when stressed, emotional acceptance of an illness, mentally detaching from the situation, avoiding

thinking about the illness etc can be considered emotional coping responses, whether adaptive or maladaptive. On the other hand, a response which attempts to alter the situation in a practical way e.g. removing the source of threat, gathering information, planning a response to address the source of threat etc can be deemed a problem focussed strategy.

Research has consistently identified key general coping styles which tend to be deployed across stressful situations. Roger et al (1993), using factor analysis, identified a rational coping style, an avoidant style of responding, and a tendency toward emotional detachment. Consistent with other research, such findings, broadly speaking, map on to the problem versus emotional distinction. Emotion focussed strategies, in contrast to problem solving approaches, reflect a sense of resignation and powerlessness in relation to stressors and consequently are more nonaction orientated and intrapsychic in character. The deployment of such strategies may be an indicator of the perceived level of controllability of life stressors. A related area of research interest is whether there needs to be an optimal matching between coping style and the degree of controllability of stressors encountered. Diabetes, for example, is an enduring condition which has both controllable (self care behaviour) and uncontrollable aspects (metabolic and stress influences on glycaemic control). Face validity would thus suggest that the coping process may require both problem solving capacities and strategies for regulating emotional distress.

Diabetes is distinctive in that it is one of those rare conditions that lends itself to self-regulation by the patient. Processes that are normally automatically performed – metabolic processes – need to be behaviourally regulated. A psychological burden typically co-exists with this sense of health responsibility. The emotional toll is compounded by the actual or anticipated emergence of diabetic complications over time (e.g. blindness, amputations, heart disease). Despite this, there is good evidence to indicate that many do succeed in mastering their self-care requirements and that rational problem solving is frequently deployed in the service of this task. For example, a number of studies have concluded that sustained adherence to diabetes requirements involved active coping on the part of patients. Smari & Valtysdottir (1997), for example, investigated the relationships between dimensions of dispositional coping (task orientation, emotional oriented coping and avoidance) on

the one hand, and levels of psychological distress and perceived adaptation to diabetes on the others. Coping was related to both self-reported adaptation to the disease and general psychological distress. Regarding the specific dimensions of coping, task oriented coping was related to positive outcomes whereas emotion oriented coping was related to negative outcomes. Sultan & Heurtier-Hartemann (2001) in a sample of 97 IDDM patients, found that task oriented coping style, presence of complications, and diabetes related distress were the main predictors of metabolic control (with the relations between psychological predictor variables and metabolic control closer for women). Karlsan (2002) compared different coping styles in a sample of 534 Norwegian adults aged 25 to 70 with type 1 and type 2 diabetes. A substantial proportion of the participants, particularly those with Type 2 diabetes, reported that they seldom engaged in active task oriented coping such as seeking social support, seeking knowledge, and planning. The study pointed up ample potential for improving active problem solving in adults with diabetes. Enzlin, Mathiew & Denyttenaere (2002) reported that men used significantly more active coping, less avoidance, less social support seeking, and less depressive coping than woman in a sample of 280 adults with Type 1 diabetes. Glycaemic control was not significantly better in men than in women however. Depressive coping and depressive symptomatology were the psychological factors which predicted psychological adjustment to diabetes in both men and women. Similarly, Fournier et al (2002), in researching adaptation to chronic illness, found that task oriented rather than emotion oriented coping increased optimism and psychological wellbeing. In a study of 126 noninsulin dependent outpatients, prospective analyses indicated that problem solving measures were significant predictors of levels of dietary and exercise self care at 6 month follow up (Toobert & Glasgow, 1991). Finally, a brief diabetes problem-solving inventory (DPSI) was evaluated for its validity, reliability, sensitivity to intervention and relationship to change in behaviour. In a sample of 279 postmenopausal women with type 2 diabetes, mediation analysis indicated that an increase in problem solving behaviour was a partial mediator of diabetes outcomes (Glasgow et al, 2004).

In contemplating the diversity of outcomes in diabetes (emotional adaptation, self-care behaviour, glycaemic control), one can speculate about the value of certain coping styles in relation to specific outcomes. Might a rational coping style be more

adaptive within the context of motivational behaviours addressing the more controllable domains of blood sugar control and self-care behaviour, with emotional strategies (detachment, disclosure) having greater utility in the field of emotional adjustment?

1.5. Human Motivation and Self-Determination Theory

To quote Ryan & Deci (2000) “human beings can be proactive and engaged or, alternatively, passive and alienated, largely as a function of the social conditions in which they develop and function”. The self-determination theoretical perspective (Deci & Ryan, 1985) is concerned with human motivation and personality. Its primary focus is the investigation of the innate psychological needs that underlie human motivation and personal well being and of the social conditions that facilitate the meeting of those needs. The theory makes a key distinction between motivations that are autonomous and those deriving from some internalised controlling agency. Autonomous motivation is commonly characterised by human strivings which are authentic, rooted in personal volition, and have inherent value for the individual. Controlled motivation, on the other hand, derives from the wholesale internalisation of others’ value systems, resulting in behaviour which is typically forced, compulsive, and joyless. A system of negative reinforcement operates in that the cessation or attenuation of such compulsively motivated behaviour evokes feelings of guilt which, in turn, impels the person toward further inauthentic action. Assor, Roth, & Deci (2004) for example, found support for their hypothesis that parental use of conditional regard as a socializing practice predicted their offsprings introjected internalization (reflected by a sense of internal compulsion), behavioural compliance, perceived parental disapproval, resentment toward their parents and fluctuations in self esteem. In short, while conditional regard promoted the enactment of expected behaviours, there were significant emotional costs for the adult children.

Research has indicated that directives, imposed goals, and pressured evaluations, lead to the undermining of intrinsic motivation (resulting in perceived external locus of causality). Opportunities for self direction and personal choice associated with an acknowledgement of one’s feelings have, on the other hand, been shown to enhance feelings of autonomy and engender more intrinsic motivation (Deci & Ryan, 1995).

In education, for example, teachers deemed to be more autonomy supportive in their approach to teaching engender in their students greater intrinsic motivation, hunger for challenge, and curiosity (Flink, Boggiano & Barrett, 1990). Further, teachers who, themselves, are subject to pressures from above (compliance with the curriculum, colleagues, performance standards) and pressure from below (student alienation and passivity) become less self-determined in their teaching habits and, thus, more controlling in relation to their students (Pelletier, Legault & Seguin-Levesque, 2002). Similarly, students tutored with a controlling style exhibit diminished initiative in learning effectively, especially in creative conceptual processing (Utman, 1997). In childrearing research, autonomy supportive parents, relative to controlling parents, tend to have children who are more intrinsically motivated (Grolnick & Ryan, 1989). In diabetes, Williams (1998) and his colleagues, in a prospective design, demonstrated that patients' perceptions of autonomy supportiveness from their diabetes health care providers related to increased patient autonomous motivation, increased perceived competence, and improvements in glucose control over twelve months. In a follow up study, Williams et al (2004) found that changes in perceptions of autonomy and competence predicted changes in glycaemic control.

Self-determination theory articulates the social conditions, contemporary and historical, which shape these different types of motivations. To the extent that personal autonomy is respected and nurtured, core motivations will derive from authentically chosen goals/interests, and, most likely, will be self-sustaining. Autonomy supportive contexts involve taking a person's perspective, acknowledging their feelings and minimizing pressure. In other words, relationships which are sensitive to the personal needs of the individual will assist the development of authentic and self-sustaining motivational tendencies. Controlling contexts, on the other hand, involve pressure from another to think, feel, or behave in a particular way. When narcissistic agendas are imposed upon an individual to the extent that personal autonomy is suppressed or curtailed, with the implicit subtext that approval/acceptance by others requires conformity to their values and espoused cultural behaviours, motivational strivings that evolve will be forced, inauthentic, and unstable. For example, various studies have shown increased interest, confidence, persistence and enhanced performance in those people whose motivation is self-

authored, relative to those whose goal directed behaviours are associated with a sense of external control (Sheldon, Ryan, Rawsthorne & Ilardi, 1997).

When attempting to inculcate behavioural patterns in others, one can meet with varying degrees of success, ranging from a rather inert amotivational state (unwillingness), through passive compliance, to active personal commitment to stated goals. From a self-determination perspective, such motivational gradations reflect the extent of internalisation (‘to take in’) and integration (a sense of ownership emanating from one’s psychological core) of salient values and derivative behaviours. Regarding the socialization process from childhood onwards, psychological processes such as internalisation/integration are central to the self-regulation of behaviour throughout the lifespan. One difficulty is that many behaviours are not intrinsically interesting or valued, and, as such, may not be spontaneously adopted; rather, they have to be encouraged or shaped in the interest of the wellbeing of the individual or those around him. As a theory, SDT is particularly concerned with the processes through which such nonintrinsically motivated behaviours may eventually become self-determined. A crucial determinant, within this framework, is the nature of social and environmental influences, past and present. The theory attempts an elucidation of the characteristics of varying social environments which predispose to different motivational patterns i.e. a detailing of the social conditions that nurture as opposed to undermine the processes of internalisation and integration. How to encourage or promote autonomous regulation of behaviours which are nonintrinsically motivating is of major import in many areas of human endeavour (diabetes self care behaviour is a prime example). In the absence of a healthy action-orientation, motivation may become stagnant, intermittent, compulsive or driven by purely basic needs, to the ultimate detriment of the individual.

As nonintrinsically motivated behaviours are not naturally adopted, the usual socializing process entails the prompting, modelling, or valuing of such behaviours by those with whom the person has, or hopes to have, some sort of mentoring relationship. Face validity would thus suggest that a sense of relatedness or emotional connection to others is crucial to the process of internalisation. Thus, a tenet of SDT is that emotionally supportive environments – positive relationships – are pivotal to the internalisation process. In support of this, Ryan, Stiller & Lynch (1994) demonstrated

that children who felt emotionally close to, and cared for by, their respective parents and teachers, more fully internalised the regulation of positive school behaviours. Behaviours only take on meaning and value in so far as core needs for relatedness are met.

Perceived competence is, according to the theory, also central to the internalisation of nonintrinsically motivated behaviours. Behaviours are more likely to be adopted if there are high feelings of self-efficacy associated with the enactment of those activities. Enhancing competence, according to the theory, should thus facilitate internalisation (Vallerand, 1997). Prior exposure to optimal challenges in association with effective, positive feedback is crucial to the development of self efficacy feelings. Mastery strivings within the personality structure are thus a function of both relatedness and self confidence.

Another major tenet of the theory, described earlier, is that the experience of autonomy supportive conditions is a predisposing factor for behavioural regulation to be fully integrated. Bearing in mind the distinction between controlled and autonomous motivations, autonomous regulation which is fully integrated, can only occur in the context of autonomy supportive conditions, against a background of either prior or current supportive relationships and feelings of competence. The experience of choice, volition and freedom from excessive external pressure to behave or think precisely as others prescribe, paradoxically, enables an individual to actively and voluntarily transform externally proffered values into their own. In the absence of autonomy supportive conditions, it is mainly a form of controlled motivation which will be cultivated, provided relatedness and competency needs are met.

In short, self-determination theory posits three innate, essential, and universal psychological needs (relatedness, competence, autonomy) which, once satisfied, enhance self-motivation and psychological well being, with the corollary that self authored strivings and related well being are significantly undermined when such needs are thwarted. Compulsive mastery strivings such as perfectionism and Type A behaviour patterns can be considered a form of controlled or introjected regulation wherein behavioural regulation is internalised but not integrated into the self structure. In short, motivation is driven by intrapsychic external controlling agencies. At the

level of conscious experience, behaviours may be performed to avoid guilt or anxiety or to meet the needs of an introjected self-image such as pride, vanity etc. According to Deci & Ryan (1995) controlled motivation of this type represents regulation by self-esteem which is essentially contingent in nature. Assor, Roth, & Deci (2004) showed, for example, that introjection mediated the association between conditional regard as a socialization practice and behavioural compliance with expectations

1.5.1. Healthy & Compulsive Mastery Strivings

Rational problem solving (healthy mastery) has a generally positive connotation in referring to a sense of active agency in the individual, reflecting a belief in their ability to address or transcend the challenges posed. It implies a degree of psychological hardiness or robustness deriving from a history of reasonably successful attempts to address difficulties in a person's life. In essence, it reflects a vibrant sense of agency, an active orientation in the world, fuelled by beliefs in the potential for securing successful outcomes. The concept of self-efficacy, which is essentially a construct reflecting beliefs or expectations about capacities for coping with adverse situations (Bandura, 1977, 1982), sits comfortably with a rational coping style. High self-efficacy is associated with better health outcomes and the use of health enhancing behaviours (Bandura, 1997). In a study of the network of psychological variables in diabetes (625 patients from 32 different treatment centres), subjects with strong beliefs in their self efficacy demonstrated more active rational coping which, in turn, was the only psychological predictor of HbA1c values (Rose et al, 2002). As an attitude, it points up an active orientation in life, a desire for engagement/commerce with the world to mould/shape according to one's needs. As such, it can be characterized as a mastery striving which is healthy in nature ie. not driven by unresolved compulsive psychological needs/conflicts.

This contrasts with dispositional mastery strivings which are more pathogenic in nature. For example, individuals with perfectionist tendencies exhibit a pursuit of mastery which is often compulsive and rigid in character. To that degree, it can be characterised as a form of compulsive mastery striving. Similarly, individuals with Type A personality patterns are often characterised by a competitive/achievement orientation associated with agitation/hostility and insecurity. This sort of drive toward

mastery tends to be more emotionally charged and general in character (as opposed to the more situation specific aspect of perfectionism). In general, compulsive mastery strivings tend to be more vulnerable to derailment than more benign or healthy drives toward mastery.

In diabetes, such qualitatively different mastery strivings may have different implications for the attainment of goals which, rather than being singular and time limited, are continuous, unrelenting, and require perseverance over the life span. One might argue that a rational coping style (healthy mastery orientation), which presupposes an emotionally contained personality, might lend itself more ably to the attainment of long-term tasks/goals in comparison to more toxic achievement/ mastery strivings which imply a more brittle, conflicted personality with a propensity for more capricious motivational effort in respect of long-term objectives. In short, healthy mastery strivings (rational coping style) may be more successful in addressing the adaptational tasks of diabetes compared to compulsive mastery strivings (perfectionist or Type A behaviour).

1.5.2. Perfectionism, Mastery Strivings, and Diabetes

Perfectionism has been defined as “the setting of excessively high standards for performance accompanied by critical self evaluation” (Frost , Marten, Lahart & Rosenblate, 1990). The ‘all or nothing’ quality of such belief systems may not foster a sufficiently flexible/resilient coping style consistent with the sustaining of effort towards goals which are difficult to achieve. In recognition of this, interview themes of parents of 30 adolescent girls with insulin dependent diabetes mellitus (IDDM) included ‘ letting go of perfectionism’ among their strategies for helping their children cope with the challenges of diabetes. To quote one parent ‘ I don’t get hung up on one blood sugar number any more...I pick the most important battles and let the rest go’. (Mellin et al, 2004). Fear of failure is the undercarriage of perfectionist strivings – sometimes resulting in avoidant tendencies (procrastination, premature termination of effort, reluctance to undertake tasks in the first instance etc) to guard against the possibility of failure. However, where efforts have been expended in the service of realizing high personal standards, a poor ratio of positive outcomes relative to expended efforts may be corrosive of ones self esteem over the longer term. Indeed, at

the level of cultural conditioning, the imperative toward excellence and success is deeply embedded in the human psyche; societal programming serves to reinforce and potentiate the effects of in-house indoctrination in perfectionist values.

Perfectionist behaviour reflects a frantic concern with obtaining approval which, in turn, highlights insecurity at a personal level. This need for inclusion within the herd indicates a clear dependency on others for feelings of 'okayness'. The weight and centrality of these forces at an intrapsychic level will bear directly on the propensity for negative affective and cognitive reactivity in any context which, by symbolic association, 'maps onto' and thus activates core emotional needs and related defensive structures. In diabetes, periodic monitoring/evaluating of glucose levels (self checking, clinic evaluations) thus potentially resonates, at the affective level, with early formative experiences imbued with a constant sense of being evaluated (and thus judged) by others, whether overtly, or implicitly by, for example, the prizing by parents of high standards of performance, extolling the performances of others (unfavourable comparisons), provision of models of success etc.

Wrestling with diabetes has been described as like trying to keep a football six feet permanently under water. Sustaining glycaemic control over the longer term can require immense effort but, with help and support, can be achieved. Frequently, despite continued efforts at control, blood glucose levels can be difficult to modulate for reasons which may or may not be apparent. Indeed, research has demonstrated a relatively weak relationship between self care efforts and metabolic control (Glasgow, 1987). Self reports often reveal a sense of failure and demoralization associated with disappointing clinic-based glycosylated haemoglobin scores (a measure of average blood glucose over a 3 month period) particularly after a period of sustained effort to maintain good control. Such descriptions mirror the sense of futility and unworthiness of a child who rarely 'measures up' in his parents eyes irrespective of his performance level. The existence of rigid cognitive structures (internalised parental injunctions) concerning the need to succeed - achievement/ perfectionist beliefs - may well constitute a psychological vulnerability in a domain where total success is not possible. Moreover, according to Wolpert & Anderson (2001), in the present culture of audit and evidence based practise, an exclusive focus on clinical treatment standards in diabetes management may encourage a vulnerability to perfectionism in

both patients and the clinicians. Given that behavioural science research has demonstrated frequent associations between perfectionism and both behaviour and mood disorders, it extracts a heavy price. If preordained standards drive professional attitudes, ideal and unrealistic biological goals may be chased by the patient, with the potential for frustration, demoralization and gradual demotivation always in close proximity. Ramirez Basco (1998) details clearly the emotional and motivational difficulties in diabetes care associated with perfectionistic attitudes in both patients and clinicians.

The potential for frequent ‘lapses’ in diabetes control to escalate into a sustained cognitive/behavioural ‘relapse’ (low self efficacy/defeatist beliefs, loss of motivation, poor emotional adjustment) is strong in this context (Marlatt & Gordon, 1985). As one patient declared at a diabetes conference “I feel I am being constantly judged by my glucometer and it’s for life “. The constant effort to stay invested indefinitely in meeting targets without any obvious dividend (save the vague proposition of staving off serious health problems over the longer term) has to be unique in both in the unrelenting nature of demand and the leap of faith required. Added to this, the impossibility of obtaining perfect control ensures that self care efforts will often go unrewarded; at most, some intermittent reinforcement will be the norm. With such an obscure relationship between self care efforts and control outcomes, staying invested in diabetes management may thus require a soft ‘internal critic’ – one with moderate expectations and allowing for average performance. This feedback system may be better adapted to the vicissitudes of blood sugar control. Wolpert & Anderson (2001) maintain that behaviour change is the only realistic goal for any patient and that keeping the distinction between behavioural and biological goals is crucial to helping a patient to remain engaged in their diabetes self care.

1.5.3. Type A, Mastery Strivings, and Diabetes

In the field of cardiac research, a constellation of psychosocial cardiac risk factors was discovered by Friedman & Rosenman (1959, 1974). They observed that their patients who had cardiac problems tended to be intense, competitive, concerned with achievement, aggressive or hostile, over committed and time urgent. This particular constellation, labelled as Type A Behaviour Pattern, was described by the authors as

“an action emotion complex that can be observed in any person aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time, and if required to do so, against the opposing efforts of other things and other persons” (1974, p.67). Strube et al (1986) demonstrated that Type A individuals rated more achievement-related adjectives as self descriptive, relative to those items devoid of such traits. Similarly, Westra & Kuiper (1997), in their research on Type A self descriptions, revealed themes centred on achievement-striving and accomplishment. They described “a high degree of intensity in pursuing their goals (workaholic, striving, labouring) with some suggestion of a hostile, angry substrate (explosive) in self-definition.” An earlier study by Westra & Kuiper(1996) found performance evaluation, personal accomplishment and competitiveness with others as being the specific dysfunctional cognitions which differentiate Type A from other domains of psychological maladjustment. They reasoned that perfectionistic standards together with the central importance of performance and accomplishment for self evaluation may underlie the intense competitiveness witnessed in these individuals. Positive self perceptions can only be maintained by high performance levels, as self worth is inextricably bound up with personal achievements. This constellation pattern fits well with the concept of ‘controlled motivation’ described by self determination theory. Glass (1977) reported that, when one is concerned mainly with Type A aspects such as performance, perception of challenge, attributional style or motivational behaviours evoked by the threat of loss of mastery or personal control, a global Type A score is an adequate predictor. As a global construct, Type A behaviours can all be regarded as mastery strategies to maintain control in challenging situations and thereby maintain self esteem (Glass, 1977).

Any primary schematic structures (eg. Type A) which intensely ‘push’ for mastery/control in life could ensure that primacy is given to attainable goals, with other ‘less achievable’ outcomes, such as managing diabetes, being subordinated in the ‘strivings’ hierarchy. This attitude, understandably, could negatively affect diabetes self care behaviour and also, the emotional adjustment to the condition particularly given that poor control often leads to both short and long term serious health complications. Moreover, intense achievement strivings also give way to heightened stress reactivity through time urgency, competitive anger/hostility, impatience etc. The demanding requirements of the self care regimen may not fit well with a

compulsive, busy lifestyle. In one study, being 'too busy' was the most common reason cited for low levels of self-care across different components of the diabetes regimen (Wilson, 1986). Diabetes, with all its treatment paraphernalia and related routines, can be demanding of time and effort. One can understand how such health concerns may suffer in one whose interaction with the social world is characterized by compulsive attempts to achieve 'more and more in less and less time'.

1.5.4. Rumination, Compulsive Mastery Strivings, and Diabetes Distress

As earlier described, ruminative thoughts have been investigated as psychological phenomena in their own right and for their relationship to emotional adjustment variables. They have been defined as conscious thoughts revolving around a common theme with a tendency to reoccur without immediate situational demands (Martin & Tesser, 1996). For the authors, ruminative thoughts are triggered by the discrepancy between an individual's goal and perceived progress towards this goal. The relevance for diabetes management is clear. It is a domain which is fertile territory for the growth of ruminative tendencies. With the inevitability of periodic discordance between goals sought and outcomes attained vis a vis blood sugar levels, the stage is set for internal psychological conflict. A further exacerbating predisposing factor for internal conflict is the presence of perfectionistic strivings/belief systems. By definition, perfection allows little room for error. Against the backdrop of a very difficult area of human endeavour, perfectionism invites psychological conflict. A tendency toward emotional rumination may well be a psychological derivative of such core inflexible belief systems pertaining to human goals/standards within the context of a difficult management task.

In support of this, Flett G., et al (2002), in correlational analyses of a sample of 65 students assessed on several psychological measures, reported that a tendency towards perfectionistic cognitions (i.e. automatic thoughts involving perfectionistic themes) was associated with a ruminative response orientation and a tendency to report experiences of intrusive thoughts and images following stressful events. The study supported the notion of a salient cognitive aspect to perfectionism and that the experience of perfectionistic cognitions and related ruminative thoughts contribute to levels of psychological distress. Flett, Greene, & Hewitt (2004) in a sample of 177

undergraduate students, demonstrated that perfectionistic cognitions were strongly associated with anxiety sensitivity involving fears of cognitive dyscontrol. Stober, J (2001), in a sample of 180 students, demonstrated that worrying ruminations had substantial correlations with procrastination and perfectionism, and, in particular, with perfectionistic concern over mistakes and doubts. Moreover, worry, while unrelated to excessively high parental standards, was related to parental criticism and expectations. Theoretical models of the worry process posit a close relationship between worry and procrastination (ie. impaired capacity for rational problem solving).

Perfectionists are known to cope with stress in self defeating ways. For example, they may persevere with unrealistic standards, engage in ruminative thinking, be highly self critical in relation to perceived failures with a related tendency to overgeneralise the sense of failure, and experience a preponderance of negative emotions. etc. (Flett et al 1991). In repeated surveys of levels of emotional distress in people with diabetes, strong feelings of guilt when a person is 'off track' with their diabetes was one of the items most consistently endorsed by the respondents (Polonsky et al, 1995). Such self blaming tendencies could be expected to be more pronounced in perfectionistic individuals given their unrealistic standards and the fact that glycaemic control is often unattainable as well as being an unending lifetime process requiring sustained effort. Heightened sensitivity to failure experiences in perfectionistic individuals would, in the context of nonattainment of goals, trigger acute feelings of worthlessness, low self esteem, and related emotional distress.

As in perfectionism, research has identified that Type A subjects make sustained efforts to achieve the best results in their performance and to excel in any tasks they undertake (Perez Garcia & San Juan, 1996). Similarly, Type A personalities, with their perennial need to achieve in competitive environments, may be ruminative prone if constant discrepancies in goal progress are experienced. In diabetes, with the high potential for intermittent loss of control in terms of both self-care behaviour and blood sugar levels, Type A individuals may be more prone to engage in diabetes related worrying ruminations and related distress. If proneness to worrying tendencies is more pronounced in individuals who experience more frequent and salient discrepancies between goals sought and goals attained, one can speculate that

individuals with perfectionistic beliefs and/or Type A behavioural patterns may be more emotionally distressed.

1.6. Stress-Illness Psychophysiological Pathways

Psychophysiological mechanisms connecting stress with illness involve the autonomic, neuro-endocrine and immune responses that are activated under stress. Core psychophysiological correlates of the stress response include the release of cortical steroids from activation of the pituitary/adrenal cortical axis, activation of the sympathetic nervous system through stimulation of the sympathoadrenal pathway, and the adrenal medulla's release of catecholamines. The pattern of activation of cardiovascular, metabolic, gastro-intestinal and immune responses covaries with the nature of the demands and resources mobilised.

Stress induced psychophysiological responses can occur at different levels (Steptoe, 1997). Firstly, psychophysiological hyper reactivity, or exaggerated stress responsivity may be characteristic. Susceptible individuals may demonstrate exaggerated responsivity in specific physiological processes, as described above. Functional and structural pathology may result if these responses are repeated or sustained over lengthy periods.

Secondly, impaired health may be mediated indirectly through reduced vulnerability and resistance to pathogens. Susceptibility to less serious infectious diseases such as colds, influenza, herpes may be potentiated by emotionally induced immuno suppression (Cohen & Herbert, 1996). The influence of such stress processes on health vulnerability adds to our understanding of the connections between stress and cancer (Garssen, 2004; Anderson, 1994). Stress plays a facilitating but not causal role under many circumstances. Succumbing to disease will depend on the simultaneous combination of stress induced vulnerability and exposure to infection in the presence of pathogens.

Thirdly, the progression or stability of existing conditions may also be affected by psychophysiological stress responses. Physiological responses may be provoked by mood disturbances that lead to, for example, increased acidic gastrointestinal

secretions, or episodes of cardiac arrhythmia and ischaemia in patients with heart disease, or disturbances in insulin regulation in diabetes. In consideration of the general finding of fluctuating blood sugar levels in diabetes associated with stress factors, it has been established that the pancreas is stimulated to release the hormone glucagon which, together with the glucocorticoids and the sympathetic nervous system, raises circulating levels of blood glucose.

1.6.1. Emotional Rumination and Physiological Functioning

In the stress-coping-disease literature, the concept of rumination or perseverative thinking, has, until recently, been largely neglected. In recent decades, research interests tended to focus on discrete major life stress events which gradually gave way to a growing interest in the cumulative strain of micro daily events and hassles. This emphasis on the objective dimensions of external events contrasts with the current interest in ruminative thinking which focuses on a subjective response characteristic of the stressed individual. As earlier described, rumination or worry can be regarded as a form of nonproductive problem-solving (Davy, 1994). Within the context of Lazarus and Folkman's coping theory (Folkman, 1984), perseverative thinking or rumination reflects a fixation in the domain of secondary coping.

Current thinking is that perseverative thinking is both a cognitive/emotional process and a psychobiological mechanism underlying the stress/disease link. It is thought to act as an internal or cognitive micro stressor as well as mediating the effects of other more objective external stressors. In short, it is both a mediator of stress and a stressor in itself. Physiological correlates of worry and rumination have included enhanced levels of cortisol. Helhammer (1985) for example, associated rumination prior to exams with higher salivary cortisol levels. Similarly, Roger & Najarian (1998) found a positive association between dispositional ruminative tendency and urinary cortisol during and after examinations. Perseverative thinking converts the immediate psychological and physiological correlates of stressful experiences into prolonged physiological activation which, in turn, predisposes to the development of somatic pathology (Brosschot & Thayer, 1998). Unlike emotional inhibition which does not mediate the effects of other more objective stressors (notwithstanding the accumulative physiological cost of inhibiting), perseverative thinking directly

mediates the impact of such stressors on physiology. The stressor is prolonged in representational form (in imagery and/or thought), a process which can maintain the activation of the organism through a prolonged state of action readiness under conditions of high threat for the individual (Dalgles & Power, 1999). Although the level of psychological vigilance is raised, physiological activation is not considered to be extreme. Rather, it is the duration of the response and the dysfunctional emotional and autonomic regulations associated with it which comprise the core pathology.

In addition to concerns about ongoing or past stressors, a large part of daily worrying often consists of anticipatory negative ruminations. Anticipating stressors and anticipatory worrying are thus additional ways in which the duration of the physiological response to stress is prolonged. For example, Smyth et al (1998), in a sample of 120 participants, demonstrated that salivary cortisol levels were enhanced in individuals who were not only experiencing stressors but also anticipating further stressors. Similarly, Spangler (1997) found pre-exam anticipatory stress responses (cardiovascular, cortisol and immunological) prior to an examination. In keeping with this, diabetes involves the occurrence of ongoing stressors combined with considerable anticipatory worrying. Polensky (1995), when developing the 'problem areas in diabetes' psychometric instrument (PAID), revealed that items most frequently endorsed by diabetic patients included feelings of guilt over mismanaging their diabetes coupled with fears of possible complications in the future. Regarding the content of ruminations/worries in patients with diabetes, Tak-Yingshiu, A. & Yee-man Wong, R (2002), from a content analysis of thirteen participants, identified the following: hypo and hyper glycaemia as a constant threat, sustaining optimal glycaemic control, maintaining a working life, psychological burden of blood sugar self-monitoring, and feeling alone with the threat involved. Thus, continuous or intermittent anticipatory worry may also be an integral aspect of emotional adaptation to diabetes.

A number of authors (Everson et al, 1996; Brosschot et al, 1998) have described perceived uncontrollability of stress (with related feelings of hopelessness/helplessness) as a crucial psychological stressor which possibly mediates the effect of psychological attitudinal variables on physiological/health states. Brosschot et al (1998), in a study of 86 male teachers, found a stressor-induced decrease in the

number of T helper cells in subjects perceiving low control of an acute stressor while controlling for the effect of mood changes. In all probability, there is a mutual nurturing relationship between perceived uncontrollability and perseverative thinking which, in combination, serve to prolong the physiological activation of the organisms. Experientially, compulsive ruminations can evoke feelings of loss of control of one's own emotions and thought processes. In diabetes, the ever present threat of short and long term complications is fertile ground for the development of negative psychological attitudes (perceived uncontrollability). Ruminative thinking may be the process which serves to maintain and intensify such attitudes.

1.6.2. Neurobiological Correlates of Ruminative Thinking

The involuntary, repetitive, and abstract nature of perseverative thinking can be construed as a failure of inhibitory neural processes. Thayer & Lane (2002) described negative rumination as resulting from the disinhibition of adaptive mechanisms associated with the frontal lobes. Disinhibition of thalamic structures, being associated with primitive neural circuits responsible for approach and avoidance behaviour, triggers a range of threat related processes such as fear, hypervigilance, and autonomic activity associated with the fight or flight response. Under ordinary circumstances, within this network of reciprocally interconnected neuro structures, the pre-frontal cortex exerts an inhibitory influence on thalamic structures concerned with defensive behaviour. Accordingly, the organism retains the capacity for flexible responding in association with shifting environmental demands. However, with disruptions to this inhibitory network, rigid defensive reactions emerge with associated autonomic, affective and attentional inflexibility (all of which are features of perseverative ruminations). Emotional rumination, in prolonging physiological activation beyond the traditional reactivity period of a temporal stressor, may then be a direct mediator of the relationship between stress factors and somatic pathology.

1.6.3. Emotional Inhibition and Physiological Functioning

For many years, a negative relationship between emotionally expressive behaviour and autonomic responsivity has been demonstrated i.e. the inhibition or holding back of overt emotional expressiveness frequently resulting in an overreaction at the

autonomic arousal level. This has informed theoretical speculations about the origin and maintenance of psychosomatic disorders. Studies in the early part of the last century identifying high physiological activity in subjects suppressing emotional expression fashioned the concepts of internalisation (physiologically, within the person) and externalisation (behaviourally, outwardly directed), coping styles in the service of psychic tension regulation (Traue & Deighton, 2000). The term 'internaliser' designates a person exhibiting a low level of emotional expressiveness under stress in combination with high physiological arousal; an "externaliser", on the other hand, combines high expressiveness with low levels of physiological arousal in social situations. In the last decade, there has been renewed interest in the role of emotional expression/ suppression in health (Kennedy, Moore & Watson, 1999). Psychophysicists are increasingly concerning themselves with the effects of inhibiting or expressing emotions on physiological systems (Labott et al, 1990). In one study of emotional inhibition with a sample of 43 men and 42 women, the experimental group (a suppression condition) demonstrated a mixed physiological state characterized by decreased somatic activity, decreased heart rate, and increased sympathetic nervous system activity (Gross & Levenson, 1997). Thus, although inhibition may be adaptive in a short term social stress situation, it is frequently associated with dysfunctional bodily reactions. Over the longer term, it is likely to have a deleterious effect on the individual, at a neurobiological, social/behavioural and/or cognitive level.

The research literature would, in general, suggest that emotional inhibition is potentially harmful when it is related to immunological dysfunction, physiological, endocrinological hyper arousal, longstanding dysregulation of emotions within the person, and/or if it disturbs the individual's interpersonal relations. This finding also receives indirect corroboration from the studies which verify that close personal relationships, in assuaging negative emotions, enhance health partly through their positive effects on immune and endocrine dysregulation (Kiecolt-Glaser et al, 2002). Arguably, the benefits of interpersonal support are mediated by available opportunities for emotional disclosure.

1.6.4. Theory of Inhibition & Disease - Pennebaker (1989, 1995)

Pennebaker (1989,1995), in his theoretical speculations about emotional inhibition, describes the process by which failure to confront traumatic events results in poor health. The principal assumption of his theory of inhibition is that physiological work is required to inhibit ongoing behaviour, thoughts and feelings. The heightened autonomic responses of 'internalisers' may, it is proposed, reflect the work of behavioural inhibition. With the progression of time, the physiological work of inhibition functions as a low level accumulative stressor, depleting the body's resources for resisting illness. As with all protracted stressors, this sustained inhibition may thus give rise to increases in stress related conditions such as asthma, skin and cardiovascular disorders, cancer, pain presentations etc.

Pennebaker (1988) theorizes that people need to express emotions generated by stressful experiences. In general, energy is required to inhibit expression in contexts characterized by disclosure fears. This process of inhibiting feelings, which naturally strive for expression, is physiologically straining and stressful. Pennebaker maintains that a behavioural inhibition system is recruited which, when activated, results in negative health outcomes mediated through immuno suppression. This behavioural inhibition system was initially proposed by Gray (1987). More commonly known as the Reinforcement Sensitivity Theory, Gray proposes two distinct neurological systems, the behavioural Inhibition system (BIS) and the Behavioural Activation System (BAS). The former is sensitive to signals of punishment, unfamiliarity and nonreward, and of promoting anxiety and avoidant tendencies. The latter, on the hand, is sensitive to reward experiences and relief from punishment and is associated with approach behaviour. These major brain systems are thought to underlie the personality dimensions of anxiety and impulsiveness (which mirror the freezing response and fight/flight response respectively which are activated under conditions of high threat). In support of this, Knyazev et al (2002) demonstrated high beta and gamma EEG activity in frontal lobe areas and low delta and theta activity in temporal , parietal and left frontal areas in subjects high in BIS scores , a finding consistent with the hypothesis that behavioural inhibition is associated with high cortical arousal, particularly in the right hemisphere.

1.6.5. Neurobiological Correlates of Inhibition

Neurobiological correlates of inhibition have been demonstrated in endocrine, muscular, digestive, respiratory, cardiovascular, and immune functions. As one example, in studies of delayed muscle tension recovery following stress, the role of emotional inhibition in prolonging physiological activation was affirmed. In one study involving a sample of 42 adult males, reductions in autonomic activation and muscle tension were considered an adaptive relaxation response after relief from a stressor. As predicted, emotional inhibition was negatively related to changes in physiological activation - repressive coping styles predicted less reductions in such indices, indicating a physiological cost of inhibiting feelings (Kaiser, 1995). In considering the potential physiological systems involved, the endocrine system is one prominent gateway as emotions trigger the release of pituitary and adrenal hormones with manifold effects including alterations in immune and cardiovascular function (Rozanski et al, 1999). Negative emotional states can activate the sympathetic-pituitary-adrenal medullary axis and the hypothalamic-pituitary-adrenocortical axis. Rabin (1999) has reported on numerous studies suggesting that a variety of emotion responsive hormones such as adrenaline and noradrenaline, adrenocorticotropin hormone, and cortisol can evoke changes in immune function with reciprocal influences on endocrine systems. Depression, for example, can cause elevations in cortisol with consequent adverse immunological changes.eg. defects in vaccine responses (Vedhara et al, 1999). Further, Roger (1997) found that cortisol secretions during stress were moderately correlated with emotional inhibition (with an even stronger association with rumination). Consistent with Pennebaker's theory of inhibition and disease, such evidence is corroborative of the conceptualisation of emotional inhibition as a low level cumulative stressor with psychophysiological correlates. The involvement of the endocrine system in many stress related conditions is probably mediated in part by changes in hormonal levels associated with the physiological work relating to emotional inhibition. Moreover, the relative inability to successfully unwind after stressful episodes (reflected in a propensity for excessive rumination) may be reflected in a slower return to neuroendocrine baseline levels (Frankenhaeuser, 1986).

One study, investigating the potential health benefits of emotional disclosure in diabetes patients (i.e. focussed writing about stressful experiences over four consecutive days), found significantly fewer incidences of physical illness and less depressive symptoms in the experimental group compared with controls. Interestingly, there was no demonstrable effect of disclosure on mean self-recorded blood sugar levels or HbA1c scores (Bodor, 2004). However, the sample was small (twenty two participants), and the study did not address the issue of individual differences in stress reactivity. It is possible that individuals with a higher loading on emotional inhibitory tendencies may have derived more of a ‘release’ from focussed disclosure with corresponding benefits in physical health and metabolic control. Recent challenges to the Inhibition model point to improved health benefits of written disclosure about past, ongoing and upcoming events (Smyth, 1998), calling into question whether prior nondisclosure of a specific stressful experience is necessary or sufficient for effective disclosure. Rather, a general tendency to suppress feelings may result in emotional dysregulation of a sort that impacts negatively on physiology and health. Unexpressed painful emotional states may maintain the disturbing physiological correlates at a heightened level of intensity. Disclosure, on the other hand, if repeated overtime, can result in a habituation effect – progressive reductions in physiological indices and subjective feeling states over time. Differences in the propensity for emotional disclosure may thus need to be considered in studies concerning the psychophysiological effects of emotional inhibition.

1.7. Stress Reactivity and Glycaemic Control

While stress has been indirectly linked to poor metabolic control through its interference with self care behaviours, changes in glucose control may also be mediated through more direct physiological mechanisms implicated in stress reactivity (Bradley, 1998).

With indirect mediation, stress can effect changes in behaviour patterns which, in turn, may disrupt self-care behaviours (Barglow et al, 1984). For example, those who are prone to ‘hurry sickness’ (type A characteristics) may find the tasks of blood glucose monitoring and investing time in preparing well balanced meals inconvenient or irritating. This lack of prioritisation afforded to such ‘incidental’ behaviours could

understandably, disrupt metabolic controls. With direct physiological mediation, stress induced alterations occur in sympathetic and pituitary activity (increases in catabolic hormone levels and decreases of anabolic hormones). Increases in blood glucose levels may, in many cases, occur in people with diabetes due to this psychophysiological mediation pathway. Reductions in blood glucose levels have, however, been known to occur in a smaller minority.

1.7.1. Stress Reactivity and Glycaemic Control: Individual Differences

Experimental studies of stress and blood glucose control have revealed contradictory results. For example, Edwards et al. (1985) reported an absence of significant changes in blood glucose control in response to stressful activities (e.g. mental arithmetic and public speaking). Greenhalgh et al. (1992) researched the effects of specific stressors on changes in blood flow at injection site. The mean levels of blood glucose increased in some patients but reduced in others under acute stress conditions. Such studies strongly indicate the importance of individual differences when attempting to understand the relationship between stress and blood sugar levels.

A potentially important mediating variable is the stress responsiveness of individual patients recruited in such studies. In general, although the pattern of research to date suggests that increased daily stress will have a significant positive relationship with blood sugar levels in both IDDM (Hansen & Pritchard, 1986) and NIDDM (Goetsch, Abel & Cope, 1994), scrutiny of subjects blood glucose response to stress highlights that some people are more stress reactive than others. For example, in one study (Halford et al, 1990), only half the sample of 15 participants had significant associations between stress and blood glucose levels. Stress had a significant effect on blood glucose levels for each of the 7 subjects after the effects of diet, exercise and insulin administration were partialled out. With regard to those individuals deemed to be stress reactive, general research findings indicate that the majority show an increase in blood glucose levels under stress with a significant minority showing a decrease in blood glucose levels. As an example, Aikens et al (1994), in a study of 25 women with IDDM whose daily stress and blood glucose levels were monitored over 30 consecutive days, found blood glucose to be higher on high stress days than on low stress days, with a third of the sample demonstrating significant positive associations

between stress and same-day glucose. Riazi et al (1996) identified strong individual differences in blood glucose stress reactivity. In 13 of the 54 subjects, blood glucose levels were significantly associated with daily stress levels. Moreover, those who evidenced strong correlations between stress and same day glucose also had higher HbA1c levels. Stress was also related to next day blood sugar levels in 8 participants, suggesting that the effects of stress may be prolonged. Similarly, research by Kramer et al (2000) suggested that the strength and direction of the association between stress and blood glucose control shows substantive variation between individuals. Further, Anderson & Kris (2003) found that, when exposed to psychosocial stressors, a loading on trait negative affectivity predicted short term blood glucose and HbA1c but only in a small number of individuals.

Such findings reveal the limitation of previous research studies which relied on analysis of group differences or which adopted individual measures of blood glucose. The concept of individual difference as a moderator variable has been replicated repeatedly in more recent research, as reported above, in increasing our understanding of the relationship between stress and blood sugar levels. On the ground, this typically translates, for an individual patient, into “trial and error” learning as to how their blood sugar levels respond to different types of stress (as stated earlier, while increases in blood sugar levels are the most common form of stress reactivity, decreases are not uncommon).

The concept of individual difference also receives indirect corroboration from studies investigating the effectiveness of stress management techniques for individuals to aid diabetes management. In short, research indicates that such methods may be useful for some people but not others. The evidence tends to suggest that relaxation training is most valuable for those individuals who, in addition to having poorly controlled diabetes, also felt that stress disrupted their diabetes control and were concurrently experiencing stressful events (Bradley et al, 1985). The general pattern emerging from such studies is that those who either show stress-induced disturbance of blood glucose control or who are anxious and autonomically reactive benefit most.

1.7.3. Psychophysiological Mediation of Stress:

Implications for Metabolic Control

As reported above, being in a state of heightened autonomic arousal has been shown to affect blood sugar levels. A predisposition toward stress-induced physiological reactivity coupled with delayed recovery from such autonomic arousal are characteristic features of stress reactivity. As earlier reported, emotional detachment has been shown to be negatively correlated with deteriorating health status following exposure to stress (Roger, 1995). Moreover, the tendency toward emotional rumination (thinking about upsetting events after they have occurred) and, to a lesser extent, emotional inhibition, have been shown to relate directly to delayed physiological recovery following stress (Roger, 1998). Tendencies toward emotional rumination and inhibition thus appear to be centrally involved in stress reactivity. However, Type A behaviour, a personality variable, has also been implicated in stress reactivity.

Birks & Roger (2000), in their efforts to develop a measure of the Type A behaviour pattern, identified high achievement motivation, hostile competitiveness, and impatience as the core ingredients which reflected the more toxic aspects of the Type A behaviour patterns identified to date. Type A individuals are known to show higher levels of arousal under stress and often to seek out more stressful situations than Type B individuals. In trying to understand the critical component that most strongly predicts cardiac illness, research has, in recent times, pointed to the hostility component as being strongly implicated (Krantz & McCeney, 2002). As an example, in a study of attentional bias (Faunce et al, 2004), anger/hostility words were the only words to selectively attract the attention of type A individuals. They hypothesized that anger/hostility/aggression may be at a higher baseline in type A subjects which, when it finds expression in competitive situations, may be temporarily satiated (the attentional bias was present under low performance motivation conditions, but disappeared under high performance conditions). Considering the conventional wisdom that type A subjects are characterized by dysfunctional themes concerning competitiveness, achievement, and impatience, Helmers & Krantz (1996) possibly resolve this apparent contradiction between theory and research in their construct of defensive hostility which implies an unconscious perception of the threat of being

subordinated in a competitive situation. The hostile substrate may thus constitute a primed state as preparation for warding off any potential threats in the achievement/social advancement domain. Thus, anticipatory anxiety over loss of the self image may be the natural state in Type As'. Defensive anger, which reflects deep anxieties, can thus be considered an emotional 'hair trigger' mechanism designed to anticipate and defuse threats to ones self esteem. Helmers & Krantz (1996), in their investigation of the relationships among hostility, defensiveness, and cardiovascular responses to stress in 67 healthy subjects, found defensive hostility to be differentially related to cardiovascular responses in men and women. Their data suggested that the trait of defensive hostility (characterized by a hostile cynical view of the world and the need to be viewed positively by others despite this negative attitudinal set) may demonstrate associations with blood pressure levels and coronary disease in research studies where such associations are not apparent when employing measures of hostility alone.

According to Svebak (1992), the predictive value of Type A behaviour associates the performance component with competitiveness and the hostility-impatience component with physiological reactivity. Researching this domain of psychophysiological reactivity, Surwit et al (2002) examined the relationship of hostility (Cook-Medley hostility scale) to various parameters of glucose metabolism in a young, healthy sample (n=98) of African-American and Caucasian subjects. In the entire sample, hostility was found to be significantly correlated with fasting glucose readings and insulin sensitivity. Type A's may thus "carry" more inner physiological arousal on a consistent basis (emotional rumination has been linked to heightened stress reactivity i.e. intense physiological activation coupled with prolonged recovery period). Glynn et al, (2002) have shown that continued rumination about an angering situation intensifies and renders more frequent the anger experience which, in turn, results in an exacerbation of the negative consequences of anger, such as the prolonging of cardiovascular responses to the situation in question. Thus, the ruminative process may operate as a maintaining factor – prolonging the inner physiological reaction to a perceived stressful event that has since passed, or, indeed, is expected to occur in the future (anticipatory anxiety may also be a feature).

In the case of diabetes, any proneness to greater autonomic reactivity could play a moderator role between general life stress and blood sugar control. Stabler et al (1986), for example, found that type A children with type 1 diabetes demonstrated elevated blood sugar levels after playing a stressful video game whereas Type B children with the same condition showed a reduction in blood sugar levels. The Type A behaviour constellation may thus be one such moderator variable which could help explain blood sugar fluctuations in those with diabetes. A characteristic feature of Type A individuals compared with perfectionistic tendencies not associated with Type A characteristics is the generalised compulsive, arousal inducing behavioural pattern (rushing/racing/driven ambition) with an associated affective charge (hostile substrate). In other words, such moderating effects may result from a direct psychophysiological pathway (increased output of stress hormones) in combination with a more indirect behavioural pathway (time urgency undermining investment in self care tasks in diabetes).

Taken together, separate lines of research have implicated emotional rumination, emotional inhibition, and Type A behaviour as psychosocial variables which directly mediate changes in the body's stress-physiological systems. Bearing in mind individual differences in susceptibility to stress induced fluctuations in glycaemic control, these psychosocial variables merit investigation as potential mediators of metabolic control.

1.8. Rationale

The current research draws together separate lines of psychological enquiry to determine both the nature of the interrelationships of the psychosocial variables posited and their relative contribution to discrete outcomes in diabetes. The examination of the relationships between inner cognitive structures (mastery strivings), illness appraisals, emotional regulation processes, and health outcomes in diabetes is important in terms of understanding the broader person environment interaction more fully. It is anticipated that illness beliefs will serve to mediate the effects of more generic personality-based structures and processes on diabetes outcomes; that personality structures will variably influence outcomes depending on

their character; and that certain physiologically reactive psychological processes can directly mediate changes in blood sugar levels.

1.8.1. Hypotheses

The following hypotheses, formulated in line with theoretical speculations included in the literature review, will be tested in the present study:

- (i) A relationship between emotional regulation processes and diabetes distress will be mediated by illness beliefs.
- (ii) Healthy mastery will be negatively associated with diabetes distress.
- (iii) Compulsive mastery will be positively associated with diabetes distress.
- (iv) A relationship between mastery strivings and diabetes distress will be mediated by illness beliefs.
- (v) Healthy mastery will be positively associated with self care behaviours
- (vi) Compulsive mastery will be negatively associated with self care behaviours
- (vii) A relationship between mastery strivings and self care behaviour will be mediated by illness beliefs.
- (viii) Psychophysiological variables (rumination, inhibition, Type A) will contribute to variance in blood sugar levels after controlling for self care behaviour (diet, exercise, blood sugar monitoring).

CHAPTER 2

METHOD

2. METHOD

2.1. Participants

The sample was recruited from adult diabetic patients in a local district hospital in Northern Ireland. Eligibility criteria were: having a diagnosis of type 1 or type 2 diabetes of at least 12 months duration, and being responsible for one's own diabetes self care. In the statistical analysis, the sample size varied from 94 to 96 across the individual measures employed.

2.2. Procedure

Research participation was initially sought by a diabetes nurse specialist when patients were attending for their scheduled appointment at the diabetes hospital outpatients clinic. Those patients who agreed to participate subsequently met with the researcher who explained the purpose of the study and stressed the confidentiality of data obtained. After obtaining informed written consent and demographic details, all participating subjects were fully acquainted with the questionnaires to ensure that test instructions were understood. They were asked to complete the questionnaires in their own time at home and to return them in the stamped addressed envelope provided. Follow up telephone contact was made with those participants who failed to return their completed questionnaires within 3 weeks. To enable candid responding, code numbers rather than names were used on the questionnaires. The participants glycosylated haemoglobin scores at the time of their clinic visit and at 6 month follow up were also obtained from hospital records with the patients written consent.

Of the 106 patients who agreed to participate, 10 neglected to return their completed questionnaires despite follow-up telephone contact. There was no significant difference between 'completers' and 'noncompleters' on the continuous demographic variables of age, duration of diabetes, and years in education (t-test). Of the categorical demographic variables, there was no significant difference between the two groups in marital status, living circumstances, medical complications, diabetes

type and insulin dependence; however, there were significantly more males and employed people among noncompleters relative to completers (chi-square test).

2.3. Measures

i) Personal Models of Diabetes Questionnaire (Hampsen et al, 2000). The assessment of personal models has evolved over time from a lengthy interview (Hampsen et al, 1990) to a short questionnaire (Glasgow, Hampsen, Striker & Ruggiero, 1997). The brief questionnaire used in this study was composed of 7 items concerning diabetes and its general management in addition to 10 regimen area specific questions. A 5 point Likert scale (1=not at all through to 5=extremely) was used for all items. The respondent's scores on the three variables (perceived seriousness of their diabetes, perceived effectiveness of treatment, perceived control over one's diabetes) were obtained by computing the mean rating of the component items.

In assessing *perceived seriousness of their diabetes*, the mean of three items was computed ("how serious is your diabetes", "how worried are you about developing complications of diabetes", "how much has having diabetes changed your activities").

Perceptions of treatment effectiveness were similarly assessed by obtaining the mean of three items. Two items reflected beliefs about the general importance of following the treatment regimen ("how important is following your self-care recommendations for controlling your diabetes" and "how important is controlling your glucose level for avoiding complications from diabetes"). The third component was composed of 10 regimen specific questions for which a mean was computed (exercising regularly, not smoking, testing blood glucose regularly, recording blood glucose results regularly, checking your feet regularly, following a low fat/high fibre eating plan, not eating many sweets, drinking little or no alcohol, managing sick days as recommended, and, making sure you get regular medical tests for diabetes related problems). Each one of the 10 regimen areas were rated on a 5 point Likert scale for the importance of controlling diabetes (from, "probably not important" to "very important"). A similar 5 point Likert scale was also used to rate the various regimen areas for their degree of helpfulness in preventing complications of diabetes (from

“probably not likely to help me” to “very likely to help me”). The two ratings obtained for each regimen area were averaged, the mean of all averages obtained was computed and then added to the two general important items to obtain an overall perceived treatment effectiveness score (as stated above, the overall score for this construct was the mean of the three values obtained).

Perceived control over one's diabetes was assessed by two items, again, with a 5 point Likert scale (“how much control you feel you have over your blood glucose levels” and “how frustrated do you feel when trying to take care of your diabetes”). Previous studies (Hampsen et al, 2000) demonstrated acceptable internal reliability for the scales notwithstanding the small number of items in each scale (seriousness 3 items, $\alpha=.57$; treatment effectiveness 3 items, $\alpha=.74$; control, 2 items, $\alpha=.53$). Evidence for the validity and internal reliability of the questionnaire was originally based on a study of 2000 adults with diabetes (Glasgow et al, 1997) which demonstrated that the personal model scales had good internal consistency and predicted variance in domains of self care behaviour.

ii) Multi-Dimensional Perfectionism Scale (Frost et al, 1990). The MPS is a 35 item questionnaire which was devised to assess perfectionism. The scale is composed of 6 subscales which were scored by summing the items. In addition, there is an overall perfectionism score which is the sum of all the subscales except the organization subscale. The 6 subscales measure specific aspects of perfectionism - 1) concern over mistakes, 2) personal standards, 3) parental expectations, 4) parental criticism, 5) doubts about actions, and 6) organization”. The *Concern Over Mistakes subscale* reflects negative reactions to mistakes eg. attempting to interpret mistakes as equivalent to failure, having a tendency to believe that one would lose respect of others following failure etc. The *Personal Standards subscale* is concerned with the setting of very high or demanding standards and the importance attached to these standards for self-evaluation. The *Parent Expectation scale* measures a tendency to perceive that one's parents set very high goals while the *Parental Criticism scale* reflects a perception that one's parents were (or continue to be) highly critical. The *Doubting of Actions subscale* measures the degree to which individuals lack confidence in their ability to accomplish tasks. The *Organization subscale* measures a tendency to be orderly or organized, and reflects a concern with order or orderliness.

Although it is often associated with perfectionism, the overall perfectionism score does not include the organization subscale score as it was found to be only loosely related to the other scales. Examples of subscale items are as follows:

CM subscale: "I should be upset if I make a mistake."

PS subscale: "If I do not set high standards for myself, I am likely to end up a second rate person."

PE subscale: "My parents set very high standards for me."

PC subscale: "As a child I was punished for being less than perfect"

DoA subscale: "Even if I do something very carefully, I often feel that it is not quite right"

O Subscale: "I try to be an organized person"

The scale has good internal consistency with values for the various subscales ranging from .88 to .93 (overall perfectionism measure = .9). The six scales are highly intercorrelated but, as already stated, the organization scale demonstrated the weakest pattern of intercorrelation with the other subscales and with the total perfectionism score as a whole. The MPS demonstrates high correlations with other measures of perfectionism, in particular, the Self-Oriented Perfectionism and Socially Prescribed Perfectionism Scales on the Multidimensional Perfectionism scale (Hewitt & Flett, 1991), the Perfectionism Scale from the Eating Disorder Inventory (Garner et al, 1983), the Self-Evaluative Scale from the IBT (Jones, 1968), and the Burns Perfectionism Scale (Burns, 1980).

iii) The Framingham Type A Behaviour Pattern Scale (Haynes et al, 1978)

This TAB measure contains 10 items which relate to 3 types of question (i) traits and qualities which characterize the respondent (5 items); (ii) how the respondent feels at the end of an average day (4 items); and (iii) whether the respondent gets upset at having to wait for anything (1 item). Regarding section (ii) of the TAB measure (questions 6-9), work-related questions related to housework for those who were not formally employed; otherwise, the questions concerned the respondent's formal employment. Total administration time for the Framingham Type A scale was about 5 minutes.

The process of item selection involved a panel of three experts choosing items from a larger set of items which were considered Type A behaviour patterns. The selected items were subjected to item and factor analysis, with items dropped if factor loadings were low or inter-item correlations were <0.15 . Items were also excluded which had a correlation co-efficient of <0.25 with the total test score. The scoring system is as follows: Section 1: very well = 1, fairly well = 0.67, somewhat = 0.33, not at all = 0. Section 2 and 3: yes = 1, no = 0. Total scores are obtained by adding the scores for the responses and dividing by a number of items (10). For all items, responses range from 0-1, with equal intervals between the range of responses for each item in section 1.

The internal consistency of the TAB scale, based on the average correlation between scale items was 0.71 and 0.70 in a sample of 809 men and 1013 women respectively. Some support for the construct validity of the TAB comes from data presented by Haynes (1978,1980). The TAB scale correlated with the anger subscales of the Framingham Anger measure; it also demonstrated correlations over 0.3 with measures of daily stress, tension, personal worries, ambitiousness, and emotional lability. However, the greatest evidence of validity of the TAB measure arises from the ability to predict coronary heart disease (Haynes et al, 1980) independent of other risk factors. TAB is characterised by time urgency, hostility, hard driving competitiveness and irritability. Although brief, the Framingham scale has been found to be predictive of CHD.

iv) The Revised Emotional Control Questionnaire – ECQ4 (Roger et al, 2000). This is a 39 item measure which assesses a tendency towards emotional rumination and inhibition. It has been extensively validated, including confirmatory factor analysis. Emotional ruminations and emotional inhibition have been shown to be significantly related to a variety of health related physiological responses to stress including heart rate recovery, blood pressure, and cortisol secretion.

The authors define the concept of emotional control as the tendency to inhibit the expression of emotional responses and postulated that it may predispose individuals to stress related conditions by inhibiting recovery from the autonomic arousal associated with emotion. The ECQ was developed to explore individual differences

in stress responses; indeed various studies have investigated the relationship between the ECQ and physiological reactivity and recovery. Research studies indicate that emotional control, in particular the tendency to mentally rehearse emotional events, may be a critical factor in prolonging physiological recovery from stress. A number of personality factors have been proposed as moderating variables linking stress and disease; confirmatory results have emerged for emotional coping strategies such as inhibition and rumination.

The original emotional control questionnaire constructed and validated by Roger & Nesselroever (1987) contained a 4 factor structure comprising rehearsal, emotional inhibition, aggression control and benign control. However, a disadvantage of the original scale is its brevity. A limited range of behaviours set up by the scale, particularly the emotional inhibition and benign control factors may have served to reduce the size of the correlations with other questionnaire behavioural variables. Roger & Najarian (1989) expanded the original ECQ to include a wider set of behaviours and provided evidence for the validity and reliability of the new scale. The four factors derived in the analysis of the ECQ2 were similar to those obtained in the earlier ECQ scale (the ECQ2 contained many of the items in the ECQ). However, the revised ECQ2 involved the clarification of the structured variable factors and the expanded rehearsal, emotional inhibition, benign control and aggression control scales address the much wider sampling of the range of behaviours involved in emotional control.

The new factors had good internal consistency and stability over the test/retest intervals. Regarding internal consistency, reliability co-efficients were substantial and satisfactory (e.g. rehearsal: 0.86; emotional inhibition: 0.77). Test/re-test reliability was assessed over a 7 week interval (sample of 86 undergraduate students) giving rise to substantial co-efficients (rehearsal: 0.80; emotional inhibition: 0.79). Concurrent validation data derived from comparison with existing scales. For example, rehearsal significantly correlated with trait anxiety ($r=0.24$) on the State Trait Anxiety Inventory (STAI, 1970), the rehearsal factor correlated significantly with the neuroticism dimension of the Eysenck Personality Questionnaire ($r=0.57$), while emotional inhibition was significantly correlated ($r=0.37$) with the extraversion

dimension of the EPQ. On the Paulhus Spheres of Control measure of locus control, the interpersonal control dimension was negatively correlated with inhibition ($r=-0.56$) and rehearsal/rumination ($r=-0.37$)

Due to their importance as moderator variables in research linking stress and illness, Roger, Guarino & Olason (2000) expanded the ECQ rumination (rehearsal) and inhibition scales. Confirmatory factor analysis established the structure of the new scales. Rumination measures the tendency to continue thinking about distressing events after they have occurred and, in association with emotional inhibition, has been found to play a significant role in prolonging physiological recovery following stress (Roger & Jameson, 1988; Roger & Najarian, 1998). Research evidence suggests that rumination has been centrally responsible for changes in health status during adaptation. Inhibition was also implicated but to a lesser extent.

On the most recently revised ECQ (ECQ4), 19 items measure rumination and 21 items measure inhibition. Items are marked true or false (and scored 1 and 0 respectively). As already stated, rumination measures the tendency to continue thinking about emotionally upsetting events after they have occurred. Test items include: "I remember things that upset me or make me angry for a long time afterwards"; "I get worked up just thinking about things I have said in the past"; "I often find myself thinking over and over about things that make me angry".

Emotional inhibition reflects a tendency to experience inner conflict around expression/disclosure of feelings. Test items include "when someone upsets me, I try to hide my feelings"; "If I receive bad news in front of other, I usually try to hide how I feel"; "I seldom show how I feel about things".

The scoring system allocates 1 point for 14 items marked true and 8 items marked false on the Inhibition scale. On the Rumination scale, 1 point is awarded for 12 items marked true and 6 items marked false.

v) The Revised Coping Styles Questionnaire – CSQ3 (Roger, 1996). This was initially a 60 item scale for measuring coping strategies. While previous studies had suggested that there were three primary components in coping, namely task, emotion,

and avoidance, the validation of the CSQ confirmed these results while, in addition, uncovering a new factor, termed distancing or detachment. The CSQ yielded scales for rational coping, emotional coping, avoidance coping, and detachment (new factor). Detachment refers to the feeling of being independent of a stressful event and any emotions associated with it. This fourth detachment scale has since been merged with emotional coping to form a single scale (labelled detachment).

There was high overall internal consistency with the CSQ in the construction/validation of the scale, with satisfactory coefficient alphas obtained for each of the four factors separately: rational coping 0.853, detached coping 0.897, emotional coping 0.735, and avoidance coping 0.690. The mean item intercorrelations were within the optimum range suggested by Briggs & Cheek (1986). They ranged from 0.232 for avoidance coping to 0.388 for rational coping. Following an inter-test interval of 3 months, the CSQ was returned by 116 out of a student sample of 154. Re-test coefficients were 0.801 for rational coping, 0.794 for detached coping, 0.766 for emotional coping and 0.701 for avoidance coping.

Scores on CSQ were correlated with scores on the ECQ (Roger & Najarian, 1989) as part of a concurrent validation exercise. A consistent pattern of results was reflected in the analysis, with a tendency to ruminate on distressing events (ECQ rumination) showing positive significant correlations with both of the maladaptive CSQ scales and significant negative correlations with both of the adaptive scales. Benign control (ECQ), a measure of impulsiveness, demonstrated significant correlations with three of the coping styles – rational (-), detached (-), and emotional coping (+). The analysis suggested that impulsives tend to use more emotional and less rational and/or detached coping styles. Emotional inhibition (ECQ) had a positive significant association with avoidance coping but not with the other remaining scales. Similarly, there were no significant correlations between CSQ factors and the aggression control (ECQ).

In the present study, the key variable of interest is the rational coping style subscale of the CSQ in view of its positive mastery connotation (in contrast to the more negative mastery connotation associated with perfectionism and Type A behaviour). As detachment has been found to correlate highly with emotional rumination, it was not

included as a variable of interest in the present study. Rational coping is assessed with such items as “when stressed I try to find out more information to help make a decision about things”, “when stressed I take action to change things”; “when stressed I use my past experience to try to deal with the situation” etc. A 4 point Likert scale scoring system was employed (always = 3, often = 2, sometimes = 1, never = 0) and scores range from a minimum of 0 to a maximum of up to 23. This revised version (CSQ3) of the original CSQ has 41 items.

vi) The Summary of Diabetes Self-Care Activities Scale - Revised (Toobert et al, 2000). This is a brief self-report instrument for assessing degrees of self-care behaviour across the self care aspects of the diabetes regimen: general diet, specific diet, exercise, blood glucose testing, foot care and smoking. In view of the number of studies using this measure in previous research (one of which included a survey of more than 2000 people with diabetes), the STSCA is more than likely the most frequently used self-report instrument for measuring diabetes self-care in adults. As the measure had undergone various modifications over the years, Toobert (2000) reviewed these developments and provided a new revised version based on findings from previous studies. The reliability, validity, and normative data from 7 different studies, involving 1988 people with diabetes, were reviewed and resulted in an updated version of the summary of diabetes self-care activities measure. The participants in the seven studies were mainly older adults, with a large majority having Type 2 diabetes for some years. Average diabetes duration ranged from 6.3 to 13 years with the mean age of the seven samples ranging from 45 to 67 years of age. The means for each subscale show considerable consistency across studies: patients typically reported higher levels of dietary than exercise self-care, with the highest levels reported for medication and blood glucose testing.

The internal consistency of the scales (average inter-item correlations) was satisfactory (mean = 0.47); the exception to this was specific diet which was consistently unreliable ($r=0.07$ to 0.23). Test retest correlations over 3 months were significant in all but 3 studies: the magnitude of correlations tended to be moderate however (mean $r=0.40$; $r=-0.05$ for medications to 0.78 for blood glucose monitoring). In keeping with previous research, correlations among the STACA scales assessing different self-care behaviours in the study were generally low.

The validity of the STACA subscales was indicated by correlations (mean = 0.23) with other measures of diet and exercise. Criterion variables for dietary comparisons included food records, food frequency questionnaires, and food habit questionnaires. For exercise, criterion variables included attendance at exercise classes, exercise self-monitoring data, and a physical activity scale for the elderly. All correlations were significant. Across various studies, sensitivity to change results varied widely. Analysis of pre-to-post change among intervention conditions indicated significant improvement in six of nine comparisons conditions on the STACA. With this updated information, a revised version of the STACA was developed along with a new scoring method.

This revised version consists of a core set of 11 items (used in previous studies) combined with an expanded list of 14 additional questions of potential use to clinicians/researchers. In the new version, the scoring is simplified and the best items are retained. Criteria for retaining items in this new version included (a) consistency in mean values across studies, (b) sufficient variability (c) stability over time (d) internal consistency (e) predictability (f) sensitivity to change (g) ease of scoring and (h) ease of interpretation. Moreover, in the revised version, questions on medication taking are not included because of strong ceiling effects and lack of variability. Moreover, the poor internal consistency of the specific diet scale results in a recommendation that it not be included in the scale despite its moderate to high validity. Finally, the scoring interpretation of the revised STACA scale was simplified by using days of the week instead of percentages.

Examples of self-care items on the new scale include the following: diet, “how many of the last 7 days have you followed a healthy eating plan”, score range 0-7; exercise: “how many of the last 7 days did you participate in at least 30 minutes of physical activity (total minutes of each activity including walking)” score range 0-7; blood sugar testing: “how many of the last 7 days did you test your blood sugar” score range 0-7.

vii) The Problem Areas in Diabetes Scale (Polonsky et al, 1995). This is a 20 item instrument which assesses diabetes related emotional distress. Each item reflects an

area of psychological distress unique to life with diabetes. For example, specific feeling states range from intense frustration with aspects of the diabetes regimen (feeling burned out by the constant effort to manage diabetes) to fear (feeling scared when you think about having and living with diabetes). Items are rated on a 5 point Likert scale reflecting the extent to which an item is perceived as problematic. A total score is computed by summing the total item responses. Raw scores are converted to a 0-100 scale to make them more easy to work with and understand (i.e. the total obtained for all 20 items is multiplied by 1.25 to provide a score range from 0-100).

The PAID is a valid and reliable instrument for assessing diabetes related emotional distress. In separate studies, the authors found the internal reliability of the PAID to be high (Cronbach's $\alpha = 0.95$). The items total correlations were also very satisfactory, ranging from 0.32 to 0.84 (mean 0.67). In addition, in the same studies, a number of significant correlations between the PAID and criterion variables strongly supports the hypothesis that this instrument is tapping into the core concept of diabetes related emotional distress. Regarding concurrent validity, the PAID was positively correlated with relevant psychosocial measures i.e. general emotional distress (The Brief Symptom Inventory), eating pattern (Bulimia Test – Revised), fear of hypoglycaemia (Hypoglycaemia Fear Survey), short and long term complications, and glycaemic control ($r=0.30$, $t < .0005$). PAID scores were found to be negatively associated, however, with reported self-care behaviours (the Self-Care Inventory) in contrast to the positive association with HbA1c scores.

Polonsky & Welch (1996) conducted two studies using the PAID (involving 451 and 257 subjects respectively with either IDDM and NIDDM). Data from the studies combined with its use in clinical work indicated that diabetes related distress is common, with approx. 60% of the subjects in both studies reporting at least one serious problem area (mean PAID score was 54.5; $SD=23.1$). Worrying about future complications and feelings of guilt or anxiety when 'getting off track' with diabetes management were the most strongly endorsed items. Moreover, diabetes related distress was directly associated with both self care behaviours and long term glycaemic control, after controlling for general emotional distress. That is to say, the specific feelings and frustrations evoked by the daily demands of life with diabetes may directly impact on self care behaviour and blood glucose control, and, as such,

merit a therapeutic focus in their own right. In this regard, the PAID has been found to be a useful instrument for both stimulating emotionally relevant conversations with patients and for planning, directing and evaluating treatment interventions.

viii) Metabolic Control was determined by measuring glycosylated haemoglobin levels (HbA1c). These values reflect the average blood glucose over the preceding 3 months and are considered a reliable and valid index of metabolic control.

CHAPTER 3

DATA ANALYSIS & RESULTS

3. DATA ANALYSIS AND RESULTS

Data analyses were conducted with SPSS Version 12. Descriptive statistics were computed for all respondents. Bivariate correlations were calculated to highlight the relationships between the relevant demographic and psychosocial independent variables and outcome variables - achievement of treatment goals (diabetes emotional related adjustment, self-care behaviour, and HbA1c scores). The bivariate relationships were examined for multicollinearity. A series of separate hierarchical regression analyses was undertaken to determine the predictors (demographic and psychosocial) of the relevant outcome variables (emotional adjustment, self-care behaviour, blood sugar levels). The collection of HbA1c values at baseline and 6 months follow-up will allow cross sectional and longitudinal comparisons. Given the number of statistical tests conducted, there is the possibility that the Type 1 error rate may be inflated at times. Consequently, effect sizes (correlation coefficients and beta values) were relied on to aid interpretation.

Multivariate outliers were checked by inspecting the Mahalanobis distances generated by the multiple regression program. Data assumptions were also checked by a visual inspection of the normal probability plots and residuals scatterplots of the regression standardized residuals requested as part of the analysis. To better meet the assumptions of a normal distribution, data were transformed for three separate hierarchical regression analyses:

- (i) when emotional regulation processes were compared with illness beliefs as potential predictors of diabetes distress, the *square root of distress* was the applied formula.
- (ii) when mastery strivings were compared with illness beliefs as potential predictors of diabetes distress, the *square root of distress* was applied.
- (iii) when mastery strivings were compared with illness beliefs for their predictive potential in relation to dietary behaviour, the *square of diet* was the applied formula.

3.1. Demographics

A total of 106 eligible adults agreed to participate of whom 96 returned their completed questionnaires. Nonparticipants ($n = 10$) differed significantly from participants only on gender (nonparticipants: 9 men, 1 woman, $p < .05$) and employment status (nonparticipants: 7 employed, 3 unemployed, $p < .05$).

Of those who participated in the study ($n=96$), 40 were women (42%) and 56 were men (58%). The mean age of participants was 57 years ($+ - 12.01$). The majority of respondents (81%) were married or living with a partner. In all, 83% of the sample were living with a family member (17% lived alone). The majority of the sample (65%) were either unemployed or retired; approximately one third (35%) was formally employed. The number of years in formal education was 12.3 ($+ - 2.4$). The vast majority were educated to secondary/vocational level with a small percentage educated to university level. 35 respondents (36%) had Type 1 diabetes; 61 (64%) had Type 2 diabetes. However, approximately 60% of all respondents were insulin dependent, (many Type 2 diabetics had progressed on to insulin in later years). The mean duration of diabetes since time of diagnosis was 14.02 years ($+ - 10.47$). 38% of the sample reported significant co-morbid medical conditions. Finally, “most recent” mean HbA1c score was 8.56 ($+ - 1.39$) for all respondents. Follow-up mean HbA1c score after a 6 month interval (average) was slightly lower at 8.46 ($+ - 1.21$). Demographic characteristics of the sample are summarised in Table 1.

3.2. Bivariate correlations between independent and outcome variables

Initial exploratory analysis was conducted by correlating demographic and psychosocial measures (illness beliefs, emotional regulation processes, mastery strivings) with diabetes related distress, self-management, and blood sugar control (most recent and 6mth follow up). Regarding the demographic variables, those who were insulin dependent were more likely to check their blood sugar ($r = -.36$) and to have higher blood sugar levels ($r = -.36$) at 6 month follow up. Of the psychosocial variables, beliefs concerning the seriousness of diabetes had a moderately strong

Table 1 Patient Characteristics (N= 96)

	Number (and percentage) of sample or mean and (S.D.)
<u>Demographic Variables</u>	
Age in years	57.0 (12.01)
Gender	
Women	40 (42%)
Men	56 (58%)
Employment Status	
Employed	34 (35%)
Unemployed/Retired	62 (65%)
Marital Status	
Married/cohabitating	78 (81%)
Single/widowed	18 (19%)
Formal Education	
Number of Years	12.3 (2.4)
<u>Medical History Variables</u>	
Diabetes Type	
Type 1 Diabetes	35 (36%)
Type 2 Diabetes	61 (64%)
Insulin dependent	58 (60%)
Noninsulin dependent	38 (40%)
Duration of Diabetes	14.02 (10.47)
Comorbidity	
No comorbid conditions	59 (62%)
Comorbid medical conditions	37 (38%)
Blood Sugar Levels	
Baseline HbA1c score	8.56 (1.39)
HbA1c score at 6 months.	8.46 (1.21)

Table 2 **Distribution of scores on Psychological, Behavioural and Physiological measures**

	Mean	S.D.	Range of possible values
<u>Predictor Variables</u>			
<i>Illness Beliefs</i>			
Seriousness	3.22	0.92	1 - 5
Treatment Effectiveness	4.25	0.50	1 - 5
Controllability	3.24	0.83	1 – 5
<i>Emotion Regulation</i>			
Emotional Rumination	7.47	4.84	0 - 18
Emotional Inhibition	9.36	5.30	0 - 21
<i>Mastery Strivings</i>			
Perfectionism	71.14	19.97	29 - 145
Type A	0.41	0.26	0 - 1
Rational Coping	15.77	5.00	0 – 27
<u>Outcome Variables</u>			
<i>Diabetes Distress</i>			
PAID	30.43	24.17	0 -100
<i>Self Care Behaviour</i>			
General Diet	5.14	1.71	0 - 7
Exercise	3.09	2.27	0 - 7
Blood Sugar Monitoring	4.21	2.81	0 - 7
<i>Blood Sugar Levels</i>			
Baseline HbA1c score	8.56	1.39	
HbA1c score at 6 months	8.46	1.21	

Table 3 **Summary of correlational analysis between dependent and independent variables**

	Diabetes Distress	Gen. Diet	Exer.	Blood Monit	Hbsc Base	Hbsc 6 mth
Demographics						
Age	-.28**	.19	.20*	-.19	.04	-.13
Gender	-.08	.07	-.01	.26*	.11	.08
Diabetes duration	-.08	.21*	-.01	.10	-.13	-.23*
Diabetes type	.01	-.07	.20*	-.25*	-.02	-.11
Comorbidity	.12	.12	.02	.11	.19	.28**
Employment	.06	-.20*	-.14	.06	-.01	.01
Married/single	.04	-.10	.05	.07	.27**	.18
Years in Educ.	.09	-.27**	-.04	.00	-.11	-.11
Non ins.dep.	-.17	.02	.15	-.36**	-.22*	-.36**
Illness Beliefs						
Seriousness	.56**	-.01	.06	.20	.11	.27*
Treat. Effectiveness	.23*	.24*	.17	.36**	-.11	.09
Controllability	-.59**	.35**	.19	-.00	-.28**	-.34**
Mastery Strivings						
Perfectionism	.49**	-.18	-.09	-.08	-.13	-.08
Type A	.47**	-.09	-.05	.15	-.09	.10
Rational	-.26*	.38**	.30**	.10	-.03	-.05
Emotion Regulation						
Rumination	.56**	-.09	-.05	-.18	.00	.11
Inhibition	.21*	-.09	-.07	.03	-.13	-.06

positive relationship with diabetes distress ($r = .56$) whereas beliefs about personal control of diabetes had a moderately strong negative relationship with distress ($r = -.59$). Of the emotion regulation processes, rumination demonstrated a moderate to strong positive correlation with diabetes distress ($r = .56$). Finally, in the domain of mastery strivings, perfectionism and Type A behaviour had a moderate positive relationship with diabetes distress ($r = .47$).

The distribution of scores on psychological, behavioural, and physiological measures is presented in Table 2. Bivariate correlations are presented in Table 3.

3.4. Regression Analysis

Using diabetes distress, self-care behaviour, and HbA1c scores as dependent variables, a series of hierarchical regressions was conducted with both general and specific psychosocial measures entered, after controlling for demographic variables. Only demographic variables which correlated at least weak to moderately ($r = .20$ or greater) with the relevant outcome variable were entered at step 1.

One area for concern with the regression analyses is the number of significance tests conducted leading to the possibility of an inflated Type I error rate. One method of dealing with this issue is to apply a Bonferroni correction to the significance value obtained from each test. However, this can become cumbersome to interpret and, as a conservative approach to dealing with the problem, can inflate the Type II error rate. The purpose of this study is to explore the nature of the relationships among the variables under investigation. Consequently, focussing on testing null hypotheses and the associated problems with this approach can detract from the findings. Therefore, the interpretation of the analyses presented here focuses on the standardized regression coefficients as an effect size statistic, thereby avoiding the problems of interpretation based solely on hypothesis tests.

3.4.1. Diabetes Distress: Emotional Regulation Processes v Illness Beliefs

The first regression analysis examined the power of the relevant psychosocial variables to predict diabetes related distress as measured by the PAID measure (see

Table 4). In this hierarchical regression analysis, age was entered at step 1, with emotion regulation processes (rumination and inhibition) and illness beliefs (perceived control, treatment effectiveness, and seriousness) entered at later stages. Each group of psychosocial variables made an additional contribution to variance in diabetes distress (emotion regulation processes r^2 change = .25** ; illness beliefs r^2 change = .16**).

In evaluating the contribution of each of the independent variables to the outcome measure, age (demographics), rumination (emotion regulation process), and perceived seriousness and control (illness beliefs) were the strongest predictors of diabetes distress in the final model (*age*: $\beta = -.16$; $t = -2.05$; $p < .05$; *rumination*: $\beta = .26$; $t = 2.82$; $p < .01$; *seriousness*: $\beta = .21$; $t = 2.06$; $p < .05$; *control*: $\beta = -.34$; $t = -3.66$; $p < .01$).

3.4.1.1. Mediation Analysis

For specific illness beliefs to mediate the effects of particular emotion regulation processes on distress, three criteria need to be met: (1) the emotion regulation processes and illness beliefs must be related to the outcome measure; (2) there must be a relationship between the predictor (emotional regulation process and the mediator (illness belief); and (3) after controlling for the effects of the mediator variable on the dependent variable, the relationship between the predictor and the outcome should be reduced (Barron & Kenny, 1986).

Regarding the first criterion, emotional rumination, perceived seriousness and perceived control are related to the outcome measure (see Table 4). To establish criterion 2, illness beliefs were used as a dependent variable in a separate multiple regression, with emotional rumination entered after controlling for demographic variables. Rumination predicted perceived seriousness ($\beta = .43$; $t = 5.07$; $p < .01$); and perceived control ($\beta = -.39$; $t = -4.27$; $p < .01$). Criterion 2 has thus been fulfilled. Criterion 3 has also been established as, after controlling for the effects of both perceived control and seriousness on diabetes distress, the relationship between the predictor (rumination) and the outcome variable is reduced greatly. That is, the beta weight for rumination is reduced from .49 to .26,

Table 4 Emotional Regulation Processes v Illness Beliefs: Hierarchical regression analysis to predict *square root* of diabetes related distress (including mediation analysis)

Step	Predictors	Beta	t	Adj. R2 total	R2 change
1	<i>Demographics</i>			.11**	.12**
	Age	-.34**	-3.5		
2	<i>Emotional Reg.</i>			.35**	.25**
	Age	-.28**	-3.27		
	Rumination	.49**	5.49		
	Inhibition	.02	.27		
	<i>Illness Beliefs</i>			.49**	.16**
3	Age	-.16*	-2.05		
	Rumination	.26**	2.82		
	Inhibition	.02	.19		
	Perc. Serious	.21*	2.06		
	Perc.Effect.	.03	.30		
	Perc Control	-.34**	-3.66		

also reflected in a similar change in the T value, from 5.49 to 2.82. (After controlling for the effects of perceived control alone, the beta weight for rumination is reduced from .49 to .32; after controlling for the effects of perceived seriousness alone, the beta weight for rumination is reduced from .49 to .34). This mediation analysis thus suggests that illness beliefs (control and seriousness) partially mediate the link between emotional rumination and diabetes distress,

3.4.2. Diabetes Distress: Mastery Strivings v Illness Beliefs

A hierarchical regression analysis was undertaken to determine the relative contribution of mastery strivings and illness beliefs to variance in diabetes related distress (see Table 5). After controlling for age, mastery striving variables (perfectionism, Type A, rational coping) were entered initially followed by illness beliefs (seriousness, treatment effectiveness, control). Each group of psychosocial variables made an additional contribution to variance in diabetes distress (mastery strivings r^2 change = .29** ; illness beliefs r^2 change = .19**).

Of the mastery striving variables, perfectionism was found to be the best predictor of diabetes distress in the final model (beta = .33; $t = 4.33$; $p < .01$). Of the illness beliefs, perceived seriousness and perceived control were the strongest predictors of the outcome variable in the final model (seriousness: beta = .26; $t = 2.85$; $p < .01$; perceived control: beta = -.33; $t = -3.50$; $p < .01$).

Further analysis was undertaken to examine the possibility that specific illness beliefs serve to mediate the relationship between mastery striving variables and diabetes distress. Regarding the three necessary criteria for a mediation role:

- (1) Mastery striving variables (perfectionism, type A, rational coping) are related to the outcome measure (diabetes distress) at step 2; illness beliefs (seriousness and control) also predict the outcome variable at step 3 (see table 5);

Table 5 **Mastery schemas v Illness Beliefs: Hierarchical regression analysis to predict *square root* of diabetes related distress (including mediation analysis)**

Step	Predictors	Beta	t	Adj. R2 total	R2 change
1	<i>Demographics</i>			.11**	.12**
	Age	-.34**	-3.5		
2	<i>Mastery Strivings</i>			.38**	.29**
	Age	-.21*	-2.30		
	Perfectionism	.37**	4.07		
	Type A	.23*	2.47		
	Rational	-.20*	-2.31		
3	<i>Illness Beliefs</i>			.56**	.19**
	Age	-.14	-1.77		
	Perfectionism	.33**	4.33		
	Type A	.07	0.85		
	Rational	-.07	-.83		
	Perc.Serious	.26**	2.85		
	Perc.Effect.	.04	0.49		
	Perc Control	-.33**	-3.45		

(2) A separate regression analysis demonstrated a relationship between the predictor variables (mastery strivings) and the mediator (illness beliefs): that is, type A predicted perceived control ($\beta = -.27$; $t = -2.70$; $p < .01$); rational coping predicted perceived control ($\beta = .39$; $t = 4.22$; $p < .01$); and type A predicted perceived seriousness ($\beta = .30$; $t = 2.82$; $p < .01$).

(3) After controlling for the effects of specific mastery variables (mastery striving) on the outcome variable, the relationship between the predictors and the outcome was reduced. Specifically, although perfectionism remained the best predictor at step 3 (showing no significant reduction in beta value from step 2 to step 3), the predictive power of Type A and rational coping style at step 2 were significantly reduced at step 3 (reducing the beta weight from .23 to .07 for Type A, and reducing the beta weight for rational coping style from -.20 to -.07). This analysis suggests that perceived seriousness and perceived control mediate the link between specific mastery strivings (Type A and rational coping style) and diabetes distress. When perceived seriousness and perceived control were manipulated independently in the mediation analysis to determine their relative impact on the predictor variables, perceived control, when introduced at step 3, effected the greater reduction in beta values for both Type A and rational coping from step 2 (from .23 to .06 for Type A; from -.20 to -.05 for rational coping). For perceived seriousness, when introduced at step 3, the magnitude of reductions in beta values was of a lesser order (from .23 to .15 for Type A; from -.20 to -.17 for rational coping). Thus, of the illness beliefs, perceived control appears to operate as a key mediator of the effects of specific mastery strivings (Type A and rational coping) on diabetes distress. However, illness beliefs do not mediate the effects of perfectionism on diabetes distress.

3.4.3. Self-Care Behaviour: Mastery Strivings v Illness Beliefs

A second series of hierarchical regression analyses examined the power of relevant psychosocial variables (mastery strivings and illness beliefs) to predict an individual's self-care behaviour (general diet, exercise, and blood sugar monitoring). After entering the relevant demographic variables, mastery strivings were entered at the second stage, followed by illness beliefs (see Tables 6.1; 6.2; and 6.3).

3.4.3.1. General Diet

Of the psychosocial variable groups identified in Table 6.1, mastery strivings contributed most strongly to variance in general diet (mastery strivings r^2 change = .17** ; illness beliefs r^2 change = .05). In evaluating the contribution of individual demographic variables to variance in the outcome measure, the number of years in formal education was the best predictor of general diet in the final model (beta = -.25; $t = -2.48$; $p < .05$ level). Of the psychosocial variables, rational coping (mastery striving) and perceived control (illness belief) were the strongest predictors of diet in the final model (*rational coping*: beta = .28; $t = 2.72$; $p < .01$; *perceived control*: beta. = .24; $t = 1.91$; $p < .06$). Although illness beliefs as a group did not make any significant additional contribution to variance in the outcome measure, a mediation analysis suggests that perceived control partially mediates the effects of rational coping on general diet (beta value of rational coping reducing from .39 at stage two to .28 at the final stage).

Criteria for Mediation: (i) in separate regression analyses, rational coping (beta= .38; $t = 4.18$; $p < .01$) and perceived control (beta= .33; $t = 3.44$; $p < .01$) predict diet. (ii) rational coping predicts perceived control (beta= .39; $t = 4.06$; $p < .01$). (iii) beta value of rational coping, reduced from .39 at step two to .28 at the final step (Table 6.1).

3.4.3.2. Exercise

In examining the power of mastery strivings and illness beliefs to predict an individual's tendency to undertake exercise, the relevant demographic variables (age, type of diabetes) were entered at step 1, followed by mastery striving variables at step 2, and illness beliefs at step 3 (Table 6.2). Neither the demographic variables nor either group of psychosocial variables made a substantial additional contribution to variance in exercise (mastery strivings r^2 change = .08: $p > .05$; illness beliefs r^2 change = .03: $p > .05$). Regarding the contribution of specific independent variables to the equation, while rational coping was the best psychosocial predictor of exercise level at step 2 (beta = .26; $t = 2.53$; $p < .05$), in the final model, such predictive power was reduced (beta = .21; $t = 2.53$; $p > .05$).

Table 6.1 Mastery Schemas v Illness Beliefs: Hierarchical Regression
Analysis to predict Self Care Behaviour (*square of diet*)

Step	Predictors	Beta	t	Adj. R2 total	R2change
<u>Diet</u>					
1	<i>Demographics</i>			.09*	.12*
	Diab.Duration	.16	1.57		
	Employ.status	-.08	-.75		
	Years in educ.	-.22*	-1.99		
2	<i>Mastery Strivings</i>			.23**	.17**
	Diab. Duration	.13	1.34		
	Employ.status	-.10	-.95		
	Years in educ.	-.24*	-2.32		
	Perfectionism	-.16	-1.58		
	Type A	.11	.97		
	Rational	.39**	4.23		
3	<i>Illness Beliefs</i>			.26**	.05
	Diab.Duration	.10	1.06		
	Employ.status	-.07	-.64		
	Years in educ.	-.25*	-2.48		
	Perfectionism	-.13	-1.34		
	Type A	.11	.94		
	Rational	.28**	2.72		
	Perc. serious.	.04	.29		
	Perc.effect.	.12	1.12		
	Perc. control	.24	1.91		

Table 6.2 Mastery Schemas v Illness Beliefs: Hierarchical Regression
Analysis to predict Self Care Behaviour (exercise)

Step	Predictors	Beta	t	AdjustedR2	R2 change
<u>Exercise</u>					
1	<i>Demographics</i>			.03	.05
	Age	.13	1.08		
	Type Diabetes	.13	1.09		
2	<i>Mastery Strivings</i>			.08*	.08
	Age	.06	.46		
	Type of diabetes	.15	1.26		
	Perfectionism	-1.22	-1.11		
	Type A	.05	.39		
	Rational	.26*	2.53		
3	<i>Illness Beliefs</i>			.08	.03
	Age	.08	.62		
	Type Diabetes	.14	1.15		
	Perfectionism	-.11	-1.00		
	Type A	.01	.11		
	Rational	.21	1.81		
	Perc. serious.	.10	.73		
	Perc.effect.	.12	.97		
	Perc control	.09	.68		

3.4.3.3. Blood Monitoring

In examining the power of the relevant psychosocial variables to predict blood sugar monitoring, the relevant demographic variables were entered at step 1, followed by mastery strivings at stage 2, and illness beliefs at the final stage (Table 6.3).

With regard to the groups of independent variables, demographics made the strongest additional contribution to variance in blood monitoring behaviour (r^2 change = .19**) followed by illness beliefs (r^2 change = .07*). Regarding the contribution of specific independent variables to the equation, gender ($\beta = .27$; $t = 2.84$; $p < .01$) and insulin dependence ($\beta = -.29$; $t = -2.22$; $p < .05$) were the best demographic predictors of blood monitoring behaviour in the final model. Of the psychosocial variables, perceived effectiveness of treatment was the strongest predictor of blood monitoring in the final model ($\beta = .26$; $t = 2.28$; $p = < .05$). The predictive power of Type A at step 2 ($\beta = .22$; $t = 2.16$; $p < .05$) was attenuated at step 3. A mediation analysis suggested that perceived treatment effectiveness may mediate the effects of type A on blood monitoring behaviour, although this mediation effect is weak.

That is, in accordance with the criteria of Barron & Kenny (1986): (i) Type A predicted blood monitoring at stage 2; perceived treatment effectiveness predicted blood monitoring at stage 3 (see Table 6.3). (ii) In a separate regression analysis, Type A was found to be a predictor of perceived treatment effectiveness ($\beta = .28$; $t = 2.82$; $p < .01$). (iii) In Table 6.3 below, Type A, while significant at step two ($p < .05$), became nonsignificant at step 3 but the beta value only reduced from .22 to 0.15.

Table 6.3 Mastery schemas v Illness Beliefs: Hierarchical Regression
Analysis to predict self care behaviour (blood monitoring)

Step	Predictors	Beta	t	AdjustedR2	R2 change
<u>Blood</u>					
<u>Monit.</u>					
1.	<i>Demographics</i>			.16**	.19**
	Gender	.24**	2.54		
	Diabetes type	-.01	-.07		
	Ins.dep	-.35**	-2.90		
2	<i>Mastery Strivings</i>			.20**	.06
	Gender	.27**	2.80		
	Diabetes type	-.03	-.23		
	Ins.dep	-.32*	-2.70		
	Perfectionism	-.10	-.96		
	Type A	.22*	2.16		
	Rational	.15	1.55		
3	<i>Illness Beliefs</i>			.24**	.07*
	Gender	.27**	2.84		
	Diabetes type	-.03	-.27		
	Ins.dep.	-.29*	-2.22		
	Perfectionism	-.07	-.70		
	Type A	.15	1.34		
	Rational	.08	.78		
	Perc. serious.	.04	.30		
	Perc.effect.	.26*	2.28		
	Perc control	.07	.52		

3.4.4.1. Glycaemic Control – Baseline

To determine the power of psychophysiological variables (inhibition, rumination, and Type A) to predict baseline HbA1c scores, a hierarchical regression analysis was undertaken, with the relevant demographic variables (marital status, insulin dependence) entered first, followed by self-care variables (diet, exercise, blood sugar monitoring) at step 2, and then psychophysiological variables (rumination, inhibition, and Type A) at the final stage (see Table 7.1). Demographic variables, as a group, contributed most strongly to outcome variance (demographics: r^2 change = .12**). Neither self care behaviours, as a group, nor psychophysiological variables, as a group, made any additional contribution to variance in the outcome measure (self care variables: r^2 change = .02 ; psychophysiological variables: r^2 change = .04). Moreover, as to the contribution of each individual variable to baseline HbA1c variance, marital status (demographics) was the best predictor at step 3 (β =.24; t =2.29; p <.05).

3.4.4.2. Glycaemic Control – 6 month follow-up

To determine the potential for psychosocial variables to predict HbA1c scores at follow up, demographic variables were entered first, followed by self care variables, then the psychophysiological variables at the final stage(see Table 7.2). As with baseline HbA1c Scores, neither self care behaviour, as a group, nor psychophysiological variables, as a group, made any significant additional contribution to variance in the outcome measure (self care variables: r^2 change = .01; psychophysiological variables: r^2 change = .04). Demographic variables as a group, on the other hand, did contribute to outcome variance (demographics: r^2 change = .36**). As to the relative contribution of each independent variable to the equation, three demographic variables – insulin dependence (β = -.47; t = -.4.44; p < .01), diabetes duration (β = -.49; t = -.4.75; p < .01) and comorbidity (β = .26; t = .2.79; p < .01) were found to be the best predictors of follow-up HbA1c scores at every step of the analysis. Moreover, one of the psychophysiological variables - emotional inhibition was the strongest psychosocial predictor of follow-up HbA1c scores in the final model (β =-.21; t =-2.18; p <.05).

**Table 7.1 Self Care Behaviours V Psychophysiological Variables:
Hierarchical Regression Analysis to predict HbA1c scores
at baseline**

Step	Predictors	Beta	t	Adjusted R2	R2 change
1	<i>Demographics</i>			.10**	.12**
	Marital Status	.26**	2.63		
	Insul.dep.	-.21*	-2.07		
2	<i>Self Care</i>			.08*	.02
	Marital Status	.24*	2.40		
	Insul.dep.	-.19	-1.68		
	Gen.Diet	-.13	-1.17		
	Exercise	.02	.21		
	Blood mon.	.06	.53		
3	<i>Psychophysiological Processes</i>			.09*	.04
	Marital Status	.24*	2.29		
	Insul.dep.	-.18	-1.61		
	Gen.Diet	-.17	-1.46		
	Exercise	.02	.15		
	Blood mon.	.12	1.00		
	Type A	-.17	-1.50		
	Rumination	.10	.82		
	Inhibition	-.12	-1.07		

**Table 7.2 Self Care Behaviours V Psychophysiological Variables:
Hierarchical Regression Analysis to predict HbA1c scores
at follow up**

Step	Predictors	Beta	t	Adjusted R2	R2 change
1	<i>Demographics</i>			.34**	.36**
	Insulin Dep.	-.49**	-5.22		
	Diab.Duration	-.44**	-4.60		
	Comorbidity	.30**	3.33		
2	<i>Self Care</i>			.33**	.01
	Insulin Dep.	-.46**	-4.35		
	Diab.Duration	-.44**	-4.42		
	Comorbidity	.29**	3.22		
	Gen. Diet	.03	.32		
	Exercise	-.11	-1.14		
	Blood Mon.	.05	.49		
3	<i>Psychophysiological Processes</i>			.35**	.04
	Insulin Dep.	-.47**	-4.44		
	Diab.Duration	-.49**	-4.75		
	Comorbidity	.26**	2.79		
	Gen. Diet	.03	.30		
	Exercise	.13	-1.29		
	Blood Mon.	.10	.95		
	Type A	-.05	-.46		
	Rumination	.17	1.51		
	Inhibition	-.21*	-2.18		

CHAPTER 4
DISCUSSION

4. DISCUSSION

This study was concerned with determining the key relevant psychosocial predictors of diabetes related distress, self-care behaviour, and glycaemic control.

4.1. Predictors of Diabetes Distress (Emotion Regulation v Illness Beliefs)

Cognitive models of psychopathology enjoy an exalted status in the psychological literature with much empirical support attesting to their validity. Indeed, over the last decade or so, such “mentalising” approaches have come to displace more experiential/humanistic approaches to human psychological difficulties. There is an implicit assumption in this cognitive world view that cognition antedates emotion, and that cognitive therapeutic strategies and techniques are prepotent in reshaping perspective which in turn begets a commensurate emotional response. However, psychodynamic or person centered therapies, in their concern with key relationship processes in the formative years, attach primacy to psychological defences or coping styles to regulate difficult or painful emotional states. The need to defensively disavow or in some way neutralize threatening affect has paved the way for a therapy process geared toward reclaiming lost experience and thus effecting more internal psychological coherence. When contemplating the differentiating features of these models, an important distinction is that between conscious appraisal processes on the one hand and unconsciously enacted emotional regulation processes on the other.

Thus, beyond conscious cognitive appraisals, the question arises as to the role of such emotion regulation processes in determining psychological adjustment. As earlier stated, research has shown that tendencies toward negative rumination in relation to a stressor may help to maintain dysfunctional emotional reverberations over a considerable period and, concurrently, exacerbate cognitive biases. In addition, the research literature on the inhibition or nondisclosure of feeling states vying for expression has affirmed how internal conflict with associated somatic symptoms is often an inevitable derivative. In the present study, the relative contribution of specific cognitive appraisals and emotional regulating processes to diabetes related distress was thus investigated to help illuminate issues of primacy, or indeed, the

character of any interrelationship that may exist. In other words, which of these processes is a significant determinant of variance in distress levels and might some variables serve to mediate the effect of the others?

In the present study, emotional rumination was found to be a predictor of diabetes distress. This association with rumination accords with Roger's finding (1993) that stress reactivity may be maintained by ruminative thinking – a form of impaired problem solving (i.e. emotional rumination is a form of sustained dysfunctional information processing). In other words, circular perseverative thinking about a distressing incident or experience serves to maintain the duration of the psychophysiological stress response significantly beyond the cessation of the stressor in question. The negative or dysfunctional information processing involved can be likened to “a runaway train” which gathers more speed and momentum over time and, in the process, becomes increasingly difficult to moderate or control. People often report how, with incessant ruminative thinking, distressing thoughts become more intense, amplified, and emotionally dysphoric, and that “switching off” the disturbing material becomes progressively more difficult. The phenomenon of the “rushing, racing mind” is well documented as is its detrimental effects on sleep. As verified by Roger (1998), delayed physiological recovery from a stressful event can be mediated by emotional rumination. As a psychological process, it thus appears to be pivotal in maintaining an agitated state with resultant negative impacts on mood, cognitive appraisals, and bodily processes.

Beyond emotional rumination, specific illness appraisals or beliefs, namely, perceived control of diabetes and the perceived seriousness of the condition, also predicted diabetes distress levels. Moreover, a mediation analysis indicates that illness beliefs (control and seriousness) partially mediated the effect of emotional rumination on diabetes distress. This suggests that specific illness appraisals are possibly secondary epiphenomena, with certain emotional control processes, namely, rumination, being the “prime mover” of distress levels. However, in the view of Brosschot & Thayer (2004, p.106.), “perseverative thinking might be viewed as the cognitive manifestation and nourisher of the deeper underlying experience of perceived uncontrollability” which causes a “continuing reactivation of specific illness related cognitive networks” leading towards “overabundant illness perception”. Perceived

seriousness may be a derivative of this. At the very least, the present finding attests to an interdependence of illness appraisals and emotion regulating processes. Partial mediation allows for the possibility of a degree of mutual influence between the two variables. With the relative primacy afforded to rumination in the present analysis notwithstanding the possibility of an interdependent relationship, an optimal therapeutic strategy may necessitate different domains of dysfunction being targeted in sequence. Although traditional cognitive models posit cognitive interventions as being centrally effective in reshaping emotional responses, the present analysis would tend to point, in the first instance, to psychological approaches which address ruminative tendencies directly as a precursor to more cognitively oriented interventions. As an example, mindfulness stress reduction training enjoys solid empirical support for its effectiveness in reducing the propensity for negative rumination (Jon Kabut Zimm, 1990; Sugiura,Y.2004). It provides a methodology to facilitate disengagement from ‘mentalising’ and to connect more fully with current ongoing sensory or ‘lived’ experience. Segal, Williams, & Teasdale (2002) provide a solid theoretical rationale, corroborative research, and associated protocols for its effective implementation in combination with cognitive therapeutic strategies to reduce vulnerability to ruminative tendencies and related negative emotional states. Their implied sequencing effect, as described, is consistent with the ‘relative primacy effect’ found in the present research. Emotional perturbation may need to be reduced to containable levels to allow therapeutic access to more verbal-rational processes (reflectiveness and heightened emotionality are often mutually exclusive processes). Indeed, when one is emotionally contained, the sense of personal control is enhanced (perseverative negative thinking, on the other hand, evokes a sense of diminished self coherence and, with that, a loss of emotional control).

Given the suggested mediating aspect of illness representations, a finding which supports hypothesis (i), efforts geared towards reshaping beliefs about the relative uncontrollability of the condition and/or correcting distorted notions about it’s perceived seriousness, may also have a role in reducing heightened distress levels. An interesting issue, however, is whether cognitive interventions in and of themselves are sufficient for “breaking” the hold of negative thoughts/ appraisals within the context of heightened emotion and physiology mediated by the ruminative response tendency. The general implication would seem to be that a broad biopsychosocial framework

should be sensitively applied when considering how best to intervene clinically with patients.

4.2. Predictors of Diabetes Distress (Illness Beliefs v Mastery Strivings)

Much of the current research literature focuses on the centrality of personal illness models in the mediation of self-care behaviours. The concept of illness representations or personal models sits comfortably within an overarching cognitive theory of emotional distress which, in short, postulates that cognitions are the primary determinants of emotional reaction and behavioural response. Indeed, the emphasis of many health behaviour models and current health research is on the proximal “experientially near” conscious cognitions with other more distal belief systems deemed to be less influential as determinants of illness related emotions and/or behaviours.

In the present study, specific illness beliefs were compared with ‘low lying’ mastery strivings for their capacity to predict levels of diabetes distress. Compulsive mastery strivings (perfectionism, Type A behaviour) can be conceptualised as broad based dispositional traits rooted in varying degrees of emotional need deprivation in the early years. At another level, they can be described as compensatory strategies forever in the service of ‘shoring up’ precarious self-esteem. That is, appraisals or evaluations about the self are based on one’s perceived ability to attain some exacting standard of performance in an area of human endeavour; in essence, a conflicted and dissatisfied self forever trying to remain psychologically buoyant through accomplishment pursuits. Drawing on cognitive theorizing, one can infer underlying cognitive schemata concerning the need to achieve, succeed etc to feel acceptable to others, and, by implication, to oneself. Compensatory strivings of this type reflect fundamental vulnerabilities within the personality. Illness representations, on the other hand, might more properly be regarded as experientially near ‘cognitive echoes’ of these deeply held but largely ‘silent’ fundamental self appraisals. A self in conflict (with related compensatory strivings) would be expected to be less emotionally contained and therefore, more prone to distorted cognitive appraisals regarding one’s life situation. Conflicted emotionality, when it intrudes, distorts and skews awareness and thus militates against reality based appraisals. The relative absence of core emotional

conflicts within the personality structure should be manifest as a more ‘imperturbable self’, capable of weathering the vicissitudes of human stresses, of maintaining a ‘steady course in troubled waters’. From a cognitive perspective, the relative absence of “evaluative schemas ” underpinning the self concept in a more integrated personality structure would be consistent with greater emotional stability in the face of “failure experiences” or episodes of nonattainment of goals (in this instance, diabetes related self-care behaviour or glycaemic control), as this would not threaten the self structure.

In the present study, of all the mastery strivings variables, only perfectionism was found to be a predictor of diabetes distress in the final model. In contemplating this finding, namely, that a loading on perfectionism increases vulnerability to diabetes related distress, the dichotomous ‘cognitive lens’ inherent in perfectionism is potentially explanatory. With a tendency to dichotomise experiences as all good/all bad, one would be highly vulnerable to emotional derailment in situations where exacting self standards were perceptibly not fulfilled. Confronted with the inevitable “lapses” associated with blood sugar control (despite the investing of sterling efforts to maintain glycaemic control), a fossilized self concept with exacting standards of performance could easily be prone to emotional destabilization. Type A behaviour patterns, on the other hand, which are also defensive and compensatory manoeuvres fuelled by precarious and uncertain self-esteem, do not have, as a constituent cognitive component, the rigid “all or nothing character” of perfectionism. Thus, while Type A mastery strivings are similarly based on a compulsive need to prove oneself, the strivings are more generalist in nature and predicated on personal advancement and social comparison issues (competitiveness). As such, diabetes related strivings may have less personal salience for such individuals in that they may not be considered relevant or central to a generalised need for personal/social advancement. Perfectionism, on the other hand, when deeply ingrained, may encompass a wide range of behavioural strivings, and be characterized by a basic intolerance of ‘less than perfect performance’ – the so called ‘tyranny of perfectionism’.

However, Type A behaviour (positive association), perfectionism (positive association) and rational coping (negative association) were predictors of diabetes

related distress at step 2, a finding which supports hypotheses (ii) and (iii). That is to say, compulsive mastery strivings are positively associated with diabetes distress whereas healthy strivings are negatively associated with diabetes related distress. In large measure, this accords with the basic tenets of self determination theory which suggests that compulsive strivings are potentially toxic to one's emotional health in circumstances where personal goals cannot be realized. Interestingly, the two types of compulsive mastery strivings (perfectionism and Type A) were the strongest predictors of diabetes distress, with the more healthy mastery striving (rational coping) remaining predictive but to a lesser degree (at step 2). However, when illness beliefs were entered at step 3, only perfectionism remained predictive with Type A and rational coping becoming less significant. At step 3, while perfectionism remained the strongest predictor, perceived control (negative association) and perceived seriousness (positive association) were also predictive. One implication is that perfectionism may have distinct psychological properties compared with Type A and rational coping in that the impact of these latter mastery strivings on diabetes distress was partially mediated by perceived control and perceived seriousness (no mediation effect was found in relation to perfectionism). In other words, their effects were dissolved in the final model while perfectionism endured as a predictor variable. Hypothesis (iv) thus receives only partial support given that mediation operates in relation to some but not all the mastery strivings variables assessed. In trying to understand this, the concepts of Type A behaviour and rational coping style merit further scrutiny.

Type A behaviour patterns indicate a form of agitated striving against a backdrop of inadequacy/insecurity feelings experienced as intolerable. Thus feelings of inferior self-worth lurk constantly in the background, resulting in a negative affective tinge imbuing all experiences. The threat to the self-structure arising from a medical condition which has, as a possibility, deteriorating health over time may well be particularly salient in Type A personalities whose driving philosophy is to maintain a competitive edge and sense of mastery at all times. The impact of Type A strivings may thus be mediated, in conscious awareness, by perceived loss of control of aspects of their condition.

Similarly, when contemplating a rational coping style, one can infer underlying feelings of self-efficacy in the face of life's struggles/challenges. A belief in the capacity for mastery/transcendence of adversity at a core fundamental level could, understandably, translate, at the level of conscious awareness, into perceptions of control of one's diabetes. Thus, while the influence of Type A and rational coping style was "dissolved" at step 2, the results suggest that their influence may "transmute" into more specific illness representations at a conscious level. Moreover, the fact that perfectionism remains predictive from step 2 to step 3, in the absence of any reduction in the relationship between perfectionism and the outcome variable at stage 3, suggests that perfectionism is characterised by distinctive psychological properties which differentiate it from Type A and rational coping. The unconscious aim of perfectionism may be the removal of any basis for criticism by others and, in the process, to keep alive the fantasy of acceptance/affirmation by others. In many ways, the audience that is being played to is 'an internal one' (an introjected relationship). Similarly, in Type A, the threat to the self structure is at the intrapsychic level - the anticipation of being left behind in a competitive world invites the prospect of censure from a punitive introjected relationship. However, the frantic affective tinge is more salient in Type A, rendering the individual more driven, restless and competitively hostile (the emotional baseline is comparatively more conflicted and turbulent, in other words). Within this context, the idea of muting this 'ambitious/driven' side to the personality can seem very threatening to such individuals as it may be perceived as affording others a competitive advantage. Thus, the need for control across key domains in one's life may be strongly felt and therefore relinquished with great difficulty. The results obtained thus suggest that certain illness representations may, in fact, be nothing more than the conscious manifestation of underlying broad based character strivings. They also suggest that the intense need for control/mastery, and associated feelings of threat in Type A may be of tyrannical proportions. In rational coping, which is a more flexible orientation, mastery/control concerns are also resonant but to a lesser degree. In perfectionism however, it is less the drive toward mastery that is problematic: rather, it is the evaluative lens used to judge performance. In short, whereas as Type As' strive relentlessly for mastery/achievement, perfectionists, while not 'driven' in such a generalist fashion, bring very judgemental standards to bear on their performances.

4.3. Interactive Cognitive Subsystems (ICS): A Theoretical Interlude

According to Interactive Cognitive Subsystems theory (Teasdale, 1993) the immediate antecedents to negative affective states are higher level meanings encoded in dysfunctional implicational schematic models. Dysfunctional models, when in the ascendancy, frequently evoke a sense of helplessness, threat, and hopelessness. Accordingly, any therapeutic strategy should strive to reinstate the operation of more adaptive schematic models of experience (a sense of ‘mastery/taking control’). In addition to specific meanings having a capacity to alter such implicational codes, Teasdale(1993) cites body state elements together with acoustic and visual elements as potentially contributory to the alteration of schematic models. In consideration of meaning elements, holistic implicit meanings, rather than specific propositional meanings, should, theoretically, be the central focus of therapy. While not negating the contribution of thought/image modification as helping to activate a “parent” adaptive schematic model, the general therapeutic strategy should be to create alternative schematic models rather than to devise a “search and destroy” mission in relation to negative thoughts (Teasdale, 1993). Indeed, beyond strictly cognitive interventions, many of the nonspecific factors of therapy, he maintains, help to regenerate “mastery/problem focussed” schematic models in place of “helplessness/hopelessness models”. Feeling that one is affirmed, listened to, and taken seriously, can create space to reflect anew and consider alternative perspectives and strategies. This often rekindles hope and a new sense of possibility.

When contemplating therapeutic direction, one must bear in mind that states of high psychological distress with associated intense emotional rumination, autonomic arousal and loss of both self-coherence and capacity for self-directed rational thinking, may negate the impact of cognitive work to address dysfunctional appraisals. As earlier reported, clinical impression would often suggest, for example, that heightened emotionality needs to be reduced to an optimal level before a person becomes amenable to more verbal reflective therapies. A therapeutic response may thus need to be crafted which is most efficacious in addressing the implicational “felt sense” of loss of control. As previously asserted, feeling states (including an awareness of disturbed physiology) are conceptually laden. They carry implicit meaning content. Heightened autonomic activity may, at the level of implicit

meanings, contribute to a generation of negative schematic models. In this context, emotion containment strategies may, for example, restore a sense of coherence and personal control. Indeed, a wide range of interventions – emotional containment strategies, experiential methods, physical exercise, stress management procedures etc are legitimate therapeutic components if they effect change at the level of higher level meanings (implicational code).

This accords with Williams (1997) thesis concerning the mutually reinforcing hierarchical layers of meaning that inform cognitive appraisals in health. To address illness appraisals independently of broader contextualizing core belief systems runs the risk, at the very least, of therapeutic ineffectiveness, and, at worst, of an exacerbation of any dysfunctional schematic models. For example, targeting illness beliefs to enhance perceived control independently of underlying dormant perfectionistic needs, may unwittingly contribute to increased feelings of helplessness/ hopelessness if rigid ‘all or nothing’ standards are not simultaneously modified. In short, multiple layers of meaning/beliefs need to be considered when formulating a general therapeutic strategy concerned with the generation of adaptive schematic models (implicational code). The present results, in identifying both the reality and relevance of certain interdependent belief systems at different levels of awareness and generality, lend support to this thesis.

4.4. Predictors of Self Care Behaviour (Mastery Strivings v Illness Beliefs)

4.4.1. Diet

Of the demographic variables, years in education predicted adherence to diet, with those who were better educated showing less adherence. This variable may partly reflect an achievement striving which influences values, attitudes, choices, and priorities. Investing more time in education could result, over the longer term, in career choices with a greater potential for personal advancement. However, such advancement may demand ambition, drive, and singularity of purpose. Remaining mindful of the need for healthy eating patterns may be more difficult under such conditions.

As to the psychological variables impinging on self-care behaviour, rational problem solving, a healthy mastery striving, was the only psychosocial predictor of general diet after controlling for demographics (years in education). Hypothesis (v) thus receives support in relation to diet. That is, healthy mastery is associated with good self care in the domain of dietary habits. There was no support found for hypothesis (vi) which suggested that compulsive mastery strivings would predict poor self care in this area. With the introduction of illness beliefs at step 3, perceived control approached significance, with a dilution of the impact of rational coping in the final model. This suggests a mediation pathway, that is, perceived control of diabetes may partially mediate the effect of rational coping on general diet. This provides partial support for hypothesis (vii) which suggests a mediation pathway between mastery strivings and self care behaviour, although the finding is specific to a particular mastery striving.

As earlier suggested, rational problem solving may be closely related to robust self-efficacy feelings – one index of personal maturity. According to Schwarzer & Fuchs (1996), self-efficacy can be considered a generalized trait reflecting a personal resource or maturity factor, and refer to studies which have successfully used generalized measures of self efficacy to predict behaviour. Motivational drives rooted in a relatively integrated, emotionally contained personality may thus be a necessary prerequisite for the task of maintaining a healthy diet over the longer term. With this motivational attitude, a diabetes sufferer may approach dietary habits in a flexible way, perceiving the need to shape general eating habits as circumstances demand. In this case, there would a relative absence of psychological threat to the self concept in situations where ‘lapses’ might occur; hence, the ability to regain the initiative would be correspondingly easier. This contrasts with behaviour informed by compulsive attitudes borne of personality based conflicts. In the latter, rigid schemas incorporating perfectionistic standards /compulsive mastery needs might be potentiated within the context of faltering dieting efforts, culminating in a derailment of any attempts to regroup and persevere. Rational problem solving, on the other hand, reflects a cognitive processing style which is less distorted by unmet developmental emotional needs. Moreover, with the healthier degrees of personality integration implied in this coping style, there may be less pressure to engage in ‘comfort eating’ – a phenomenon driven by negative emotional states. Indeed,

'comfort eating' can be regarded as a frequent cause of self care 'lapses' in diabetic patients' eating patterns. An inherent capacity for maintaining emotional stability in the face of life's pressures may reduce the emotional need for food at times of stress. As the results suggest a mediation effect, perceived control of diabetes may therefore be a context specific conscious expression of a more fundamental sense within the personality of self control, personal agency, hope and future possibility.

One implication of this result is that therapeutic efforts targeting dietary habits can address a multiplicity of levels which have the potential to activate functional schematic models of 'taking control', 'hope for the future' 'staying steady' etc. The routes to these functional parent schemas may be more or less direct in some cases. However, concern with the implicit felt sense is of paramount importance at all times. Within this context, the understandable impulse to target the more immediate dietary 'givens' may not, however, be the most therapeutically efficacious approach. Dysfunction in one specific domain of behaviour may represent a more pervasive disturbance in the personality structure. A psychological formulation which delineates the core schemas, beliefs, unmet needs and associated defenses should assist the tailoring of a strategy which is optimally effective.

4.4.2. Exercise

Adherence to recommended exercise patterns, as a self-care task, was not predicted by any of the psychosocial variables in the final model. However, rational problem solving did predict this outcome variable at step 2, a finding which, again, offers support for hypothesis (v) in a self care domain (exercise). No support was found for hypothesis (vi) That is, none of the compulsive mastery strivings were associated with self care in this area. Although termed a diabetes self care task, this domain may, in fact, be the most difficult to sustain, comparatively speaking. Research has consistently shown that the various aspects of the diabetes regimen (exercise, diet, blood monitoring, medication taking) are weakly correlated, with the life style components (diet, and, in particular, exercise) showing the poorest levels of compliance (Toobert, 2000). One reason may be that habits, once laid down, are difficult to change. Much evidence attests to the importance of instilling exercise habits in the early years if it is to become an enduring feature of adult life. There may

be a whole host of conditioning processes and environmental constraints which bind eating and exercise habits to aspects of day to day living, rendering them less amenable to change by conscious effort/decision-making. For example, a poorly conditioned body may experience negative side effects upon initial attempts at increasing exercise patterns. At a theoretical level, negative operant conditioning may result in a cessation or reduction in such routines to reduce anticipated physiological discomfort. Thus, the perceived costs of this health behaviour (anticipated pain/exhaustion) may override any perceived health benefits (Health Belief Model and Protection Motivation Theory). Similarly, a hectic, busy daily routine may constrain possibilities for undertaking exercise on a regular basis. Time constraints may act as a disincentive to exercise in those who prioritise material/financial goals over health issues. More simple constraints might be the lack of suitable walk ways, for example, in a persons locality. In short, a multiplicity of variables may impinge on this domain which override the effects of mastery strivings and/or illness beliefs. As such, the narrow range of psychosocial predictors deployed here may be insufficient to account for habits of behaviour which may be significantly influenced by environmental and conditioning processes. However, the fact that rational coping was predictive at step 2 suggests that a healthy mastery striving is an important psychological attribute when faced with a task which, by all accounts, is physically taxing, difficult to sustain, and competes with other priorities in a demanding world. Indeed, one measure of maturity is the extent to which one can deny immediate gratification needs to pursue longer term goals in the absence of any obvious dividends in the interim eg. study habits. Rational coping may, as earlier stated, reflect a degree of emotional maturity which helps a person to undertake and sustain exercise habits for longer term, not so obvious, health benefits. Psychological interventions concerned with promoting this maturity variable (which is here associated with healthy exercise habits) should ensure that content issues do not eclipse concerns with the process of intervention. In other words, an autonomy supportive therapeutic context may best promote behaviour change by encouraging nondefensive engagement and personal authorship of any actions undertaken in this field. However, beyond process issues, and given the multiplicity of influences on this variable, adopted therapeutic strategies should reflect the complexities involved.

4.4.3. Blood Monitoring

In regard to demographic variables, insulin dependence was a predictor of blood monitoring behaviour in the final model. The need to calibrate insulin dosage correctly is very important for those on insulin as short term complications can readily ensue if errors are made. Blood monitoring, as the mechanism for establishing blood sugar levels, is essential to this task of calibration and should thus be reasonably well represented in this group. Gender was also a significant predictor, with women more likely to undertake blood monitoring as required. This may reflect a greater sense of responsibility in women for their own health and wellbeing and a greater level of self sufficiency in medical self care. Observation often suggests that men, by comparison, can be somewhat dependent on their partners for managing their medication, prompting them to visit their doctor etc.

In consideration of potential psychosocial predictors, when illness beliefs, as a group, were introduced at the final stage, their additional contribution to the variance in blood monitoring behaviour was limited. Within this grouping, perceived effectiveness of treatment was predictive of blood monitoring. Moreover, there was some support for hypothesis (vii) with the suggestion of an illness belief (treatment effectiveness) mediation pathway between mastery strivings (Type A) and blood monitoring. Checking blood sugar levels may be one particular self-care domain which is distinguished by the relative complexity of learning involved ie coming to understand and act appropriately (retitrate insulin, dietary or exercise requirements) on the feedback from blood sugar monitoring to correct poor glycaemic control. The fact that perceived effectiveness of treatment was the sole psychological predictor in the final model may well suggest that primacy be given to this particular illness belief in treatment efforts. In other words, unless and until a patient can come to clearly perceive a cause - effect relationship between blood monitoring and glycaemic control from their own personal experience, blood monitoring may be considered redundant and of little value. The paraphernalia involved may actually assist them in sustaining their efforts in the service of treatment goals. As a barometer of level of understanding in this domain, beliefs about perceived effectiveness of treatment may thus be usefully explored in the first instance. The discovery of negative treatment beliefs may require that a refresher educational component be provided to refine the

persons understanding of the value of this feedback loop for individualized, and thus more efficient, self care efforts. On a more practical level, a possible need dictated by low beliefs about treatment effectiveness may be the requirement to revise frequency of insulin use, its timing, the change of eating patterns to accommodate exercise routines etc. In short, a change in the treatment regimen may need to be contemplated in accordance with current treatment efficacy considerations, life style changes etc.

Of the mastery striving variables, Type A was found to be positively associated with blood monitoring at the 2nd step of the regression analysis. This undermines hypothesis (vi) which suggests that compulsive mastery should be negatively related to self care behaviour. Moreover, no support was provided for hypothesis (v) in this self care domain. In consideration of the present finding that perceived treatment effectiveness possibly mediates the relationship between Type A behaviour and blood monitoring, the nature of these psychological variables merits further discussion.

Type A behaviour straddles two conflicting realities. At an unconscious level, there is self doubt and insecurity; at the level of conscious awareness, however, there is inflated self efficacy feelings regarding the possibilities for controlling and overcoming environmental challenges. Defensive beliefs of this nature are the mechanism which impel and maintain compulsive behaviour. Perceived effectiveness of treatment may, at one level, be sensed by the individual as a reflection of their own capacity for mastering challenges as '99% of diabetes care is self care' (Rubin, 2000, p.237). Treatment behaviours are self behaviours and thus potentially act to mirror judgements about the self. Feeling the need to control environmental threats which may jeopardise possibilities for personal advancement, Type A's may thus develop and maintain positive illusions of mastery concerning discrete behavioural diabetes tasks potentially within their immediate control. This finding accords with the theorizing of Taylor (1983) who describes a process of underlying mastery/control needs distorting illness beliefs to maintain a positive self image and keep alive hope for the future. Blood monitoring behaviour, as a discrete task within their control, may have more personal significance for Type A's in contrast to diet and exercise behaviours which can be affected by many extraneous factors beyond their immediate

control. They may not be as schema-relevant, in other words. In support of this, the current study found little support for Type A as a predictor of either diet or exercise.

4.5. Self Determination Theory: Relevance for Diabetes Adaptation

To understand the relevance of the present collective findings for psychological adaptation in diabetes (emotional wellbeing and self care behaviour), it is helpful to revisit self-determination theory as propounded by Ryan & Deci (2000). As described earlier, the authors posit a needs-based theory of human motivation. Specifically, their theory, which is solidly grounded in research, emphasizes the importance of core psychological needs for relatedness, autonomy, and competence throughout the lifespan. Problems with self-esteem only emerge when such core needs have been distorted or frustrated in some way. From a self determination perspective, there is a paradox about self-esteem: “if you need it, you don’t have it, and if you have it, you don’t need it”(Ryan & Brown, 2003, p.74). In commenting on the essential character of self-esteem, the authors describe qualitative variations, labelled, respectively, contingent and noncontingent self-esteem.

According to this theory, self-esteem issues arise from psychological need deprivation. In contingent self esteem, feeling good about oneself is conditional upon a sense of ‘measuring up’ in the eyes of others. A developmental precursor might include, for example, exposure to a form of parenting which involved the withholding of affirmation/valuing of the child if certain standards of behaviour were not met. With such conditional acceptance, the seeds of insecurity are sewn. Consequently, compensatory drives arise in the service of maintaining relatedness to others but at an emotional cost. The theory proposes that these distinctive childhood relationships (‘conditional regard’) gradually give way in adulthood to a form of behavioural self-regulation whereby actions become motivated by a constant need for approval from an ‘internal audience’. With this motivational orientation, the person has become distant from his own feeling states and, ultimately, from his/her core identity. Indeed, the identity sense is often absent or poorly formed in such cases. Arising from the wholesale internalisation of parental/societal values, it can be characterized, as a heightened sensitivity to social expectations, culminating in conformist behaviour, the pursuit of inauthentic goals originating from a ‘false self’ structure (Winnicott, 1965).

With regard to perfectionism and Type A behaviour patterns (introjected defensive interpersonal strategies to resolve conflicts associated with conditional self acceptance), the fact that both are predictive of diabetes distress is understandable. One can infer underlying unstable self evaluations, as the sense of identity is based on precarious foundations – contingent acceptance by others. Type A behaviour reflects a particular variant of mastery striving fuelled by contingent self-esteem. The defensive aspects of this self structure are manifested by an intense, agitated ‘drive’ for control in many aspects of the person’s social world. At a certain dulled level of awareness, however, the threat of loss of control/mastery frequently resonates in the background. In the present study, perceived control of diabetes is negatively associated with Type A strivings. Moreover, regression analysis suggests that perceived loss of control of diabetes may mediate the association between Type A and diabetes distress. With no such evidence of a mediator role for perceived control in the relationship between perfectionism and distress, the question arises as to the relative intensity of the need for control in these two mastery striving variables. Perfectionism, although similarly incorporating a compulsive need for acceptance through action, is not characterized by the same intensity of emotional agitation as occurs in Type A behaviour patterns. The need for control may thus be differentially weighted, intrapsychically, in these respective personality traits.

Such core schemas, if centrally relevant to problems of adaptation in diabetes, should be targeted therapeutically. Enlisting the patient to address issues of his own psychology at different levels of awareness, beyond strictly diabetes concerns may be clinically helpful. For example, becoming aware of unconscious needs/vulnerabilities (dysfunctional assumptions) driving extremist behaviour can lead to a reevaluation and revision of habitual strivings, goals, and priorities. In addition, stress management frameworks can be introduced to increase understanding of how underlying vulnerabilities can lead to stressful life style choices/patterns which, in turn, may trigger psychological and physiological disequilibrium. Moreover, beyond therapeutic approaches which attempt to forge new insights at a conscious level, a good therapeutic relationship itself may be centrally influential in effecting positive internal change not necessarily mediated by conscious awareness. For example, if a therapist is so zealous in their efforts to liberate a person from their present “impasse”

(noncompliance, for example) that they strenuously direct their efforts toward rekindling motivation in self-care behaviour, the therapeutic relationship may suffer. By not being sufficiently attuned to needs for emotional connection in, for example, a person alienated from others/family/friends, primary needs for relatedness may be overlooked in favour of an approach which directly addresses the more obvious diabetes concerns. The subtext of conditional acceptance by the therapist in this situation may be unconsciously registered by the individual. This may serve to heighten the sense of threat to the self concept, fuel defensive strivings, and ultimately maintain an amotivational state. On the other hand, a therapeutic relationship which disconfirms learned expectancies from the past through the provision of a more accepting, person centred orientation (attuning to other life stresses, for example) may afford a much needed unconditional emotional connection (relatedness) with resultant improvements in noncontingent self esteem. Moreover, increased motivation to change may be an unprompted gradual offshoot of a core sense of connectedness to an affirming, concerned person at a time of personal insecurity. Rigid compensatory strivings (i.e. perfectionism, Type A patterns) within the personality structure may be gradually loosened under such conditions. With motivational drives rendered less compulsive, a person may be better equipped, psychologically speaking, to maintain a steady course in respect of the lifelong vicissitudes of diabetes self care.

Staying within the self-determination perspective, the discovery of emotional rumination as a predictor of diabetes distress similarly suggests an anxious conflicted personality in thrall to an inflexible achievement need. That is to say, rumination, as earlier described, typically arises when continuing discrepancies arise between present reality and intensely held needs/goals/ aspirations. This constant chasm between aspirations and reality is the inevitable by-product of internalized 'conditions of worth'. Moreover, it provides the dynamic for self dissatisfaction, inner restlessness, and goal preoccupation. In the present study, while perfectionism and Type A were positively associated with diabetes distress (step 2), rational coping was negatively associated with distress. This supports the notion of underlying emotional security preoccupations being a core feature of compulsive mastery strivings – a compulsive need to engage in goal oriented pursuits, with any nonsecuring of goals evoking feelings of loss of control/failure with associated injuries to the self concept. Unfortunately, the nonproductive aspects of ruminative thinking stultifies the capacity

for constructive action and reinforces feelings of hopelessness/helplessness. While healthy mastery strivings should, theoretically, increase mastery experiences and enhance self esteem, compulsive mastery strivings, paradoxically, invite more 'failure' experiences and related feelings of distress. The presence of such dysfunctional schemas are thus fertile breeding grounds for ruminative tendencies under stress.

In short, psychological considerations beyond more immediate diabetes concerns frequently need to be addressed. In all of this, there is an implication that positive change at the level of these core structures (general values/goals/beliefs/coping mechanisms) will facilitate emotional adjustment to diabetes itself. Moreover, when addressing diabetes issues explicitly, the present findings would suggest that an autonomy supportive process may have the greatest potential for reining back the excesses of compulsive mastery strivings. Such an approach contains an implicit message that any decision to change must originate within the individual, and that any help is offered nonjudgementally and without demand characteristics. Such an approach invites nondefensive engagement as it reduces the resonance of a distant judgemental past which helped shape compulsive strivings.

4.6. Glycaemic Control (Self Care Behaviour v Emotion Regulation Processes)

As physiological correlates have been demonstrated for emotional coping processes and Type A behaviour, the present study sought to determine the relative contribution of these physiologically reactive psychosocial factors to variance in blood sugar levels, after controlling for relevant demographic variables and self-care behaviours. A comparison of haemoglobin scores at baseline (most recent score) and follow up (after a six month interval) was undertaken to permit cross sectional and longitudinal comparisons.

Regarding baseline blood sugar levels, neither self care behaviours, as a group, nor psychosocial variables, as a group, made a significant contribution to variance in the outcome variable after controlling for relevant demographic variables (marital status was a significant predictor in the final model). Moreover, no specific variable in either group was predictive of blood sugar levels. At six months follow up, however, a

number of demographic variables were predictive of blood sugar levels. Those who were insulin dependent and had comorbid medical complications had higher HbA1c scores; on the other hand, the longer one had diabetes, the better was one's metabolic control (lower HbA1c scores). As many type 2 patients proceed to insulin in later life due to problems in controlling blood sugars, the relationship with insulin dependence is understandable. In addition, comorbid conditions, in reflecting a possible progression of diabetes related pathologies, would imply a less well managed condition; blood sugar control could be, understandably, higher in this context. By the same token, length of time with the condition, in the absence of progressive secondary complications, could aid adaptation to the condition both psychologically and at the level of self management. Learning to adapt to diabetes may require much trial and error learning and considerable time to allow the establishment and consolidation of healthy routines and self care habits. Beyond demographic predictor variables, behavioural self care variables again made no additional contribution to variance in glycaemic control at 6 month follow up. However, one of the psychosocial variables - emotional inhibition - was predictive of blood glucose levels. This particular result thus provides partial support for hypothesis (viii). That is to say, a specific psychophysiological variable contributed to variance in blood sugar levels after controlling for self care behaviour.

4.7. Cross sectional and Longitudinal Comparisons

In the cross sectional design, independent variable scores were obtained after measures of the outcome variable (most recent HbA1c score) had been taken. In this context, ratings of independent variables could be reactive to outcome scores, even though they are used as predictor variables. The prospective design, relative to the cross sectional design, is a statistically more robust method for determining predictive relationships as the outcome variable measures (follow up HbA1c scores six months later) are obtained at a significant time interval after independent measures have been obtained. In the latter, any predictive relationships found between independent and outcome variables are not confounded by the problem of reactivity. Comparisons between the two designs is informative for that reason. However, there are possible statistical confounds in the present study which may limit any conclusions that may be reached. One such confound is the difference in sample size from HbA1c baseline

to HbA1c follow-up. A number of patients who provided HbA1c scores at baseline did not attend their diabetes review clinics at follow up, resulting in a reduced sample size (N reduced from 96 to 89). While HbA1c scores at baseline and follow up were highly correlated ($r = .82$), the different sample sizes may have differentially affected the separate regression analysis results.

In addition, the correlations between demographic variables and HbA1c scores varied from baseline to follow-up which, in turn, ensured that the group of demographic variables entered at step one in the separate regression analyses were not the same. For baseline HbA1c scores, marital status and insulin dependence were entered at step one. For follow up HbA1c scores, however, duration of diabetes, comorbid medical complications, and insulin dependence were entered at the first step. As regression analysis is highly sensitive to any independent variables entered, the different results obtained may be attributable to this statistical artefact.

Bearing in mind these considerations, the finding of a predictive relationship between emotional inhibition and glycaemic control at follow-up after controlling for relevant demographic variables and self-care behaviours is noteworthy given that the variance in glycaemic control for the population as a whole was relatively narrow (mean score of 8.46 at 6 months follow up: standard deviation 1.21). One implication is that a specific psychophysiological variable, in this instance inhibition, may mediate changes in glycaemic control. As earlier stated, Pennebaker (1989) drew attention to the noxious effects of emotional inhibition which involves chronic physiological 'work', and causes an accumulation of low level physiological stress. A corollary of his theory is that emotional disclosure obviates the need for autonomic work associated with the suppression of 'built up' emotion. Theoretically, this should reduce physiological stress within the individual and, as a corollary, negate the effect of stress on metabolic control.

This present finding supports the association between emotional inhibition and physiological reactivity, and, in addition, suggests that a specific physiological index – blood sugar – is directly influenced by this psychosocial variable. It undermines a previous finding by Bodor (2004) which, although affirming the link between emotional disclosure and improved health, found no specific association with

metabolic control. This apparent contradiction might be explained by the fact that differences in loading on this trait (emotional inhibition) may affect level of vulnerability to inner physiological strain under stressful conditions. The level of any health benefits of emotional disclosure may thus depend on how central this coping style is to the individuals psychological functioning. Bodor (2004) did not control for this in their research. The present result highlights the potential relevance of emotional inhibition, as a trait variable, in helping to account for individual differences in the relationship between stress and metabolic control.

In the cross sectional design, the absence of any relationship between emotional inhibition and HbA1c scores may be partially understood by the predictive relationship found between metabolic control and marital status in the final model (the prospective design did not include marital status among the demographic variables). Not being married was predictive of lower blood sugars in the cross sectional design; a tendency to inhibit emotional expression was also predictive of lower blood sugars in the prospective design. Arguably, opportunities for emotional disclosure would be reduced when one is not living with a partner. The contribution of marital status to variance in the outcome variable may therefore be attributable to reduced opportunities for disclosure (the influence of marriage on self care behaviours cannot account for marital impact on glycaemic control as these behaviours were controlled at step two in the regression analysis). The marital status variable, in possibly sharing some overlap with the inhibition variable, may have attenuated the latter's influence on glycaemic control in the cross sectional comparison. In the present sample, although small, the negative correlation ($r = -.14$) between marital status and emotional inhibition suggests this possibility of variance overlap in the two constructs.

A clinical implication of this finding is that, over and above the traditional emphasis given to medically relevant variables, namely, medication needs and self-care behaviour (diet, exercise, blood monitoring), any established tendency to internalize distressing feelings may need to be therapeutically targetted in its'own right. It points up the importance of providing an opportunity for patients to talk, in a focussed way, about the emotionally distressing aspects of either living with diabetes or, indeed, other concurrent stressors in their life. Should opportunities for emotional disclosure

be sidelined, from a treatment point of view, due to an exclusive concern with more medically oriented variables, health outcomes may suffer. The weak correlation frequently found between self-care behaviours and glycaemic control bears testimony to the potential importance of other factors in glycaemic control; opportunities for emotional disclosure may be one such factor.

The present result is consistent with the finding that physiological stress reactivity can have a direct influence on glycaemic control (Bradley's 1994) and that stress reactivity, while more frequently associated with elevated blood sugar, is occasionally associated with reduced blood sugar levels. In the present study, the beta value indicates a negative association (consistent with Bradleys 'minority' finding), suggesting that increased inhibition is associated with lower blood sugar levels. Thus, individual differences need to be acknowledged. At any rate, in keeping with the disclosure paradigm, the process of emotional disclosure may, depending on the context, attenuate stress levels and aid the restabilization of glycaemic control.

The potential clinical need for emotional disclosure aspects to the therapeutic process contrasts with a prevailing orthodoxy in many psychological communities which afford primacy to cognitive methods/ approaches for addressing disturbances of emotion, both in mainstream mental health and in relation to coping with diabetes. The heavy emphasis on such models in the clinical literature has the potential for overshadowing or peripheralising a solid and growing empirically supported knowledge base governing mind/body relationships which attest to the importance of emotional processing in health. The present finding may aid a healthy realignment in the relative importance of distinct therapeutic approaches.

4.8. Limitations of the Research

Certain limitations of the present study need to be borne in mind. Although regression analysis is primarily concerned with identifying predictive relationships between a set of independent variables and specific outcome variables, causal relationships cannot be ascertained from this correlational design. The influence of other unmeasured variables may underlie the relationships found between variables. According to Tabachnick & Fidell (1996, p.131) "demonstration of causality is a logical and

experimental, rather than statistical, problem". Cause effect relationships can only be demonstrated when systematic changes in outcome variables follow systematic manipulation of independent variables after other relevant variables have been controlled. Accordingly, while the tone of the discussion above implies causality in the relationships found, the case is certainly not airtight, from a statistical point of view. Rather, any tentative conclusions drawn are suggestive only, and are based as much on reasoned consideration of the research literature and theoretical position statements as on the results of the present study.

A specific problem in trying to determine predictors of blood sugar control in this study was the small amount of variance attaching to this outcome variable (mean baseline HbA1c score 8.56; SD of 1.39; mean HbA1c follow-up score 8.46 ; SD of 1.21). This may have statistically constrained the possibilities for uncovering authentic predictor variables as, in general, establishing relationships with other variables is facilitated by optimal amounts of variance in the variables concerned. Within this limiting context, the discovery of emotional inhibition as a predictor of blood sugar control is all the more noteworthy. Similarly, measurement of another set of outcome variables (diet, exercise, and blood monitoring) was also constrained by the limited range of item values on the scales measuring this variable (0-7). With such a narrow range of item values, variance in the outcome measure will be artificially constrained; this, in turn, significantly limits the potential for genuine predictor variables to statistically reveal themselves. More fine grained outcome measures, with a greater range of item values, might have increased the opportunities for the statistical detection of relationships. In support of this hypothesis, the relevant predictor variables entered in the regression analysis in respect of diabetes distress (the other outcome measure) contributed to significantly more variance in the outcome measure. The greater range of values employed in the diabetes distress questionnaire very probably facilitated this (range of values: 0-100; mean 30.43; S.D. 24.17). Finally, although a number of predictor variables were identified in the present analysis, the amount of variance predicted was small in many instances. Although tentative conclusions are drawn from the results, the net overall contribution of psychosocial variables to diabetes outcomes variance points up the multiplicity of factors potentially impacting on diabetes outcomes.

Regarding the Type A construct, the Framingham Type A scale used in this study possibly failed to capture all the essential ingredients of this toxic behavioural pattern. Most models of Type A behaviour pattern, for example, have typically highlighted three key aspects – time urgency, competitiveness, and hostility (Keyper & Martyn, 1989). The Framingham Type A scale, although including items reflecting competitiveness and time urgency, has few items indicative of hostility and aggressiveness (Kawachie et al., 1998). As earlier stated, while a measure such as the Framingham scale is appropriate when looking at the global construct (mastery strivings), it may not be particularly sensitive in the context of investigations of stress reactivity (hostility being the key ‘reactivity’ component as identified by research).

With respect to the findings concerning Type A behaviour, the issue of the percentage of the sample who were formally employed may limit conclusions concerning generalizability of the results. In the present study, 60% of the sample were unemployed. Type A behaviour may well be situation specific in that it implies the existence of a pressurising environment which forever carries the potential for failure or loss of control. As a personality characteristic, it may thus require certain external conditions to render it an observable pathology. In the present example, the absence of formal employment may have attenuated the effects of this compulsive mastery striving on the individual. It is hard to imagine someone being in constant ‘flight fight’ mode when living at home, either unemployed, or formally retired. Home is generally a relaxed and noncombative environment. Any type A strain in the personality structure may, as a result, have been artificially muted by the nature of the sample. In the present study, there was a moderate positive correlation between Type A and employment ($r = .33^*$). Very possibly, in a more conducive environment (ie competitive, pressurising), the impact of type A behaviour may have been more transparent, at the level of emotion, self care behaviour, and metabolic control.

While the current study purports to assess both compulsive and healthy mastery strivings, it is acknowledged that the measures used assessed different facets of these strivings depending on the particular mastery striving involved. For example, while perfectionism (cited as a compulsive mastery striving) was assessed at the level of predominantly self-referential cognitive beliefs, Type A mastery strivings were measured at the level of behaviour (the outward behaviour allowing inference about

underlying mastery strivings). Further, a healthy (noncompulsive) mastery striving, in this study, was deduced from a capacity for rational problem solving (again, an inferred construct based on a particular style of responding to stressful situations). The different modalities of measurement across these compulsive and healthy mastery domains leave open the question of the validity of the inferred construct underlying them. Future studies could employ more consistent measurement modalities across these different domains.

A related issue is the extent of construct overlap in the three types of mastery strivings. Theoretically, perfectionism and type A strivings are thought to originate from personal insecurities borne of contingent regard in the formative years and, in their manifestation, reflect a compulsive need to prove oneself worthy intrapsychically and/or in the eyes of others. Springing from a similar root and possessing similar surface characteristics raises the issue of whether there is sufficient conceptual difference in the two constructs to enable psychological measurement tools to discriminate between them for research purposes. For example, Flett et al (1994) found various components of Type A behaviour were positively associated with the three dimensions of the Multidimensional Perfectionism Scale for a male sample. In the case of females, positive associations were found with two of the subscales of the MPS. In the present study, ratings on the two scales enjoyed a moderate positive relationship ($r = .4$; $p < .01$), a finding which, although affirming the natural association between the two constructs, also suggests construct differentiation by the absence of a perfect correlation. Face validity indicates that the item content of the respective scales is different in emphasis, suggesting that the constructs, as measured here, are, indeed, qualitatively different. However, to guard against confounding of these variables, future studies concerned with these related psychological realities might look to psychometric measures with good discriminative power.

Similarly, rational coping, here considered to be a derivative of high self efficacy, might often be associated with perfectionism and Type A behaviour in circumstances conducive to favourable performance. High expectations/standards coupled with commensurate compulsive strivings might be reflected in strong beliefs in one's ability to cope with demanding situations under one's control. Hart et al (1998), for

example, found higher levels of self efficacy in those who measured highly on the socially prescribed perfectionism scale of the MPS (low self efficacy was associated with the other two subscales of the MPS, however). In the present study, rational coping was very weakly correlated with both perfectionism ($r = -.01$) and Type A behaviour ($r = .09$), suggesting that rational coping is a qualitatively different construct and possibly reflects a more adaptive flexible response tendency associated with positive emotional adjustment (unlike perfectionism and Type A behaviour which correlated positively with diabetes distress).

Another issue not addressed in the present study is the issue of content of goal strivings. According to the self concordance model (Sheldon & Elliot, 1999), those pursuing goals which are consistent with the persons developing interests and core values invest more effort in accomplishing those goals and are more likely to achieve them. In the absence of any assessment of personal goals (eg. a self listing of things a person strives to do in daily life), it is not possible to make solid judgements about the extent to which diabetes self care behaviours are included in such interests and priorities. While one can talk about compulsive mastery strivings in general, such strivings may only apply to specific behaviour domains. For example, if diabetes self management behaviours are not included within the range of a person's perfectionistic behaviours, diabetes self care may be approached quite flexibly. On the other hand, someone whose perfectionism encompasses 'all and sundry' behaviours may address diabetes self care in a rigid 'all or nothing' way. Similarly, Type A behaviour which involves the compulsive pursuit of work-related goals may result in the neglect of diabetes self care behaviours due to their perceived lack of relevance within the person's set of centralized aims and values. Another individual, however, with the same personality attributes, may locate diabetes self care efforts centrally in their mastery strivings if treatment neglect is deemed to threaten core aspirations. Future studies should include an assessment of personal goal strivings in keeping with the tenets of the self concordance model.

4.9 Conclusions

Notwithstanding the aforementioned limitations, the present findings suggest that certain underlying personality based traits and processes do have an influence on

diabetes outcomes and, as such, need to be considered when psychological issues are being addressed.

In the domain of psychological adjustment, the present findings suggest that an appraisal of particular illness beliefs for their relevance to emotional state variables should occur within the context of a broad evaluation of dispositional mastery strivings within the individual. In particular, an evaluation of the degree of compulsivity of mastery strivings may be especially pertinent to diabetes related distress levels. Meanings, appraisals and attitudes at different levels of awareness and generality are interdependent, with each level influencing, and, in turn, being influenced by the other. Therapeutic interventions should thus be tailored to address multiple levels of cognitive representation having relevance for emotional adjustment in diabetes. A person-centred autonomy supportive relationship which encourages a nondefensive exploration of the influence of underlying compulsive psychological needs and strivings, and associated values on conscious attitudes toward living with diabetes, may, by heightening self awareness, enable the emergence of more flexible attitudes with associated improvements in emotional adjustment.

Further, the present findings suggest that a specific emotion regulation process - ruminative worrying - contributes to the shaping and consolidation of negative thoughts and feelings about diabetes. Efforts to contain such perseverative thinking should result in more functional information processing and improved affect. A ruminative tendency may thus need to be therapeutically targeted as an adjunct to interventions addressing diabetes related emotional concerns through a more discursive modality. As one example, mindfulness training, with its researched effectiveness in reducing mental agitation, could be usefully co-opted as part of the therapeutic endeavour to maximize the effectiveness of more established psychological approaches (eg cognitive restructuring of negative illness beliefs /problem solving etc).

In the domain of diabetes self care behaviours, rational coping, a healthy mastery striving, was predictive, to varying degrees, of the life style self care behaviours (diet and exercise). Compulsive mastery strivings (perfectionism and type A behaviour), on the other hand, bore no obvious relationship to these behavioural domains. This

suggests that the lifestyle requirements of the diabetes regimen may not typically activate dysfunctional mastery schemas. Difficulties in judging ongoing adherence to prescribed but rather amorphous behaviours such as diet and exercise may, in the mind of the patient, obscure their relationship with glycaemic control. On the other hand, the potential for tighter control and adherence may be more readily experienced in relation to more easily calibrated discrete self care behaviours such as blood sugar checking which, in the present study, was influenced by Type A strivings and perceptions of treatment effectiveness. Thus, specific self care domains, being differentially affected by compulsive mastery strivings, may require a different emphasis in therapeutic approach. While lifestyle behaviours (diet and exercise) may be facilitated by a flexible rational problem solving style promoted within an autonomy supportive relationship, the therapeutic approach with more discrete self care behaviours such as blood sugar monitoring, should, in addition, remain sensitive to, and cater for, the potential influence of underlying compulsive mastery/control strivings.

As to psychosocial influences on glycaemic control, a specific emotion regulation process – emotional inhibition – did contribute to variance in this outcome measure. This accords with the relationship found between marital status and metabolic control. A possible explanatory factor underlying these concordant results is the cumulative destabilizing effects of physiological stress arising from the habitual nondisclosure of feelings states. In more healthy circumstances, emotions might be expressed and shared more fluidly, resulting in a reestablishment of physiological homeostasis. While the link between stress reactivity and metabolic control has been established by research, the potential importance of emotional inhibition as a physiological stressor which impacts on glycaemic levels has not been sufficiently explored. A clinical implication of the current finding is the need for a safe trusting therapeutic alliance which provides opportunities for the disclosure and exploration of any accompanying emotional concerns the diabetes sufferer may bring to the consultation. In addition to the positive general impact this may have on emotional state and self care behaviours (and thus, indirectly, on blood sugar levels), there may also be a positive specific effect on glycaemic control mediated directly by the increased physiological homeostasis arising from more routine disclosure of feelings.

Taken together, the present findings point up the relevance of enduring personality based traits and processes for understanding how people cope with diabetes. A general implication of the above is that treatment approaches should reflect a concern with the interplay between distal dispositional variables on the one hand, and proximal psychological factors more directly associated with illness dimensions on the other. Recent research trends in diabetes have tended to give primacy to the latter with scant attention paid to these broader underlying personality-based influences. The findings of the present study may help to redress that balance.

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APPENDIX A

SCATTERPLOTS AND HISTOGRAMS

*(measures of data distribution for
each regression analysis)*

Figure 1.1 Histogram

Predictor variables: Emotion regulation v Illness beliefs
Dependent variable: Square root of distress (*data transformed*)

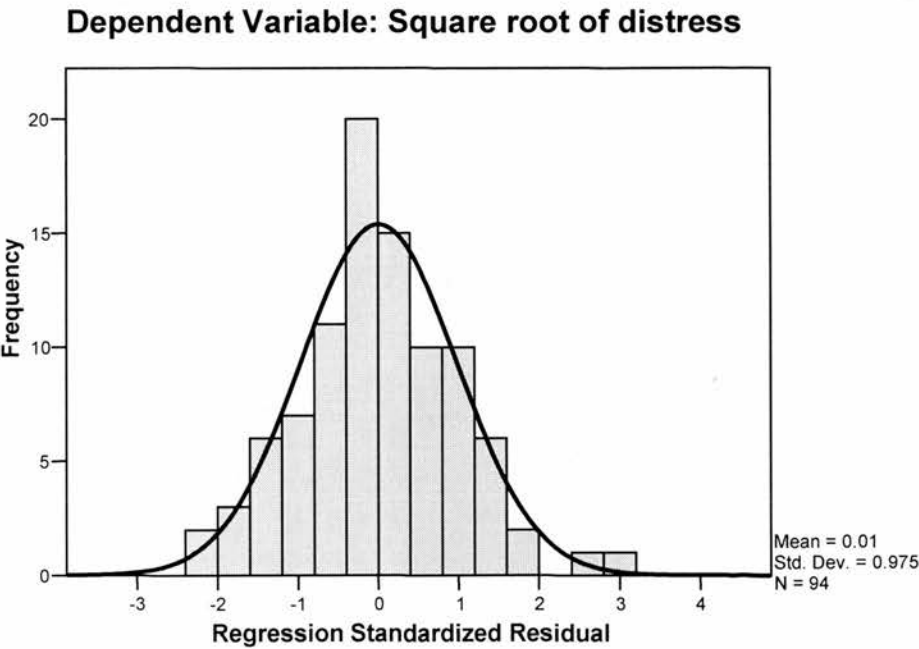


Figure 1.2 Scatterplot

Predictor variables: Emotion regulation v Illness beliefs
Dependent Variable: Square root of distress (*data transformed*)

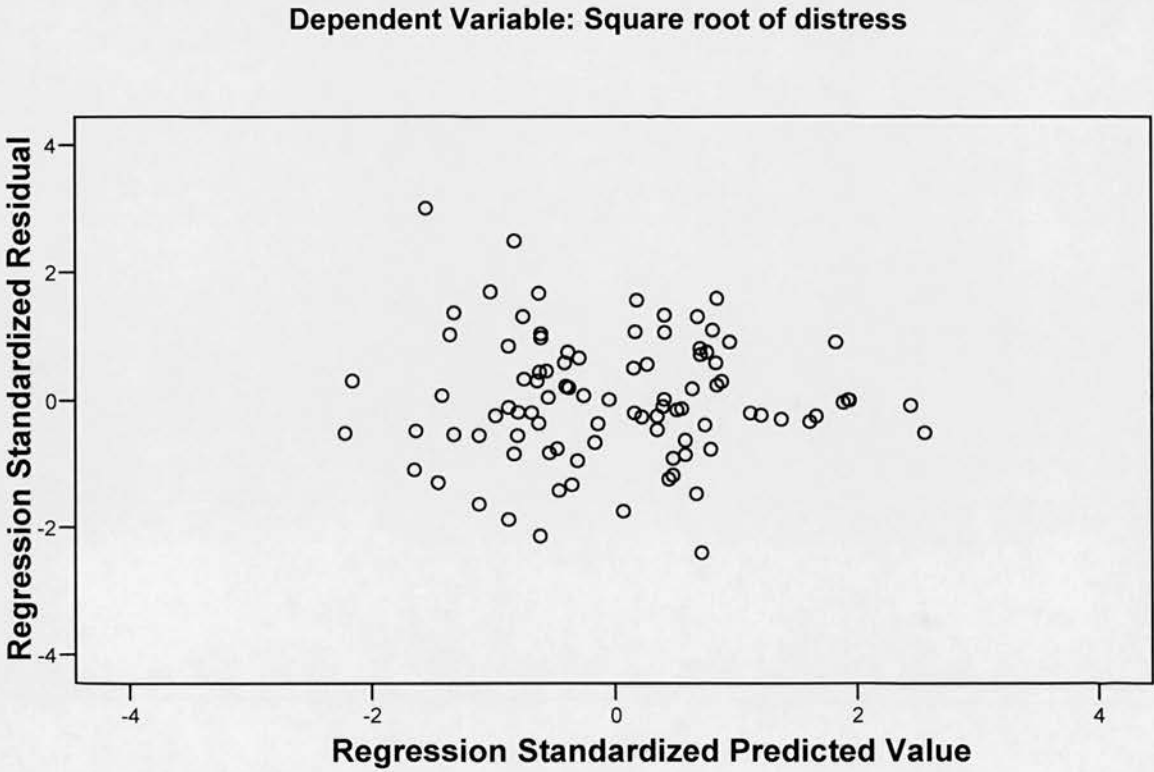


Figure 2.1 Histogram

Predictor variables: Emotion regulation v Illness beliefs
Dependent variable: Distress (*before data transformation*)

Dependent Variable: diabetes-related emotional distress

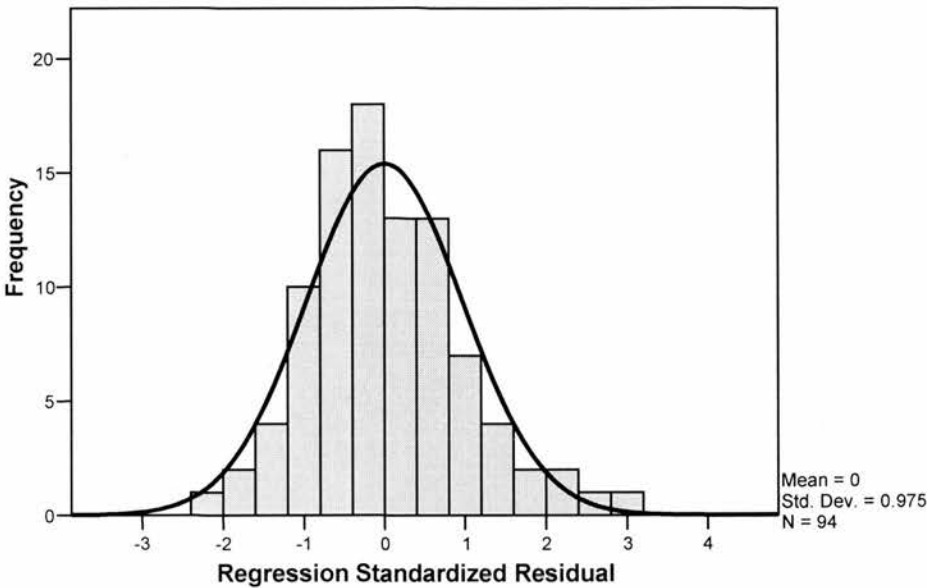


Figure 2.2 Scattergram

Predictor variables: Emotion regulation v Illness beliefs
Dependent variable: Distress (*before data transformation*)

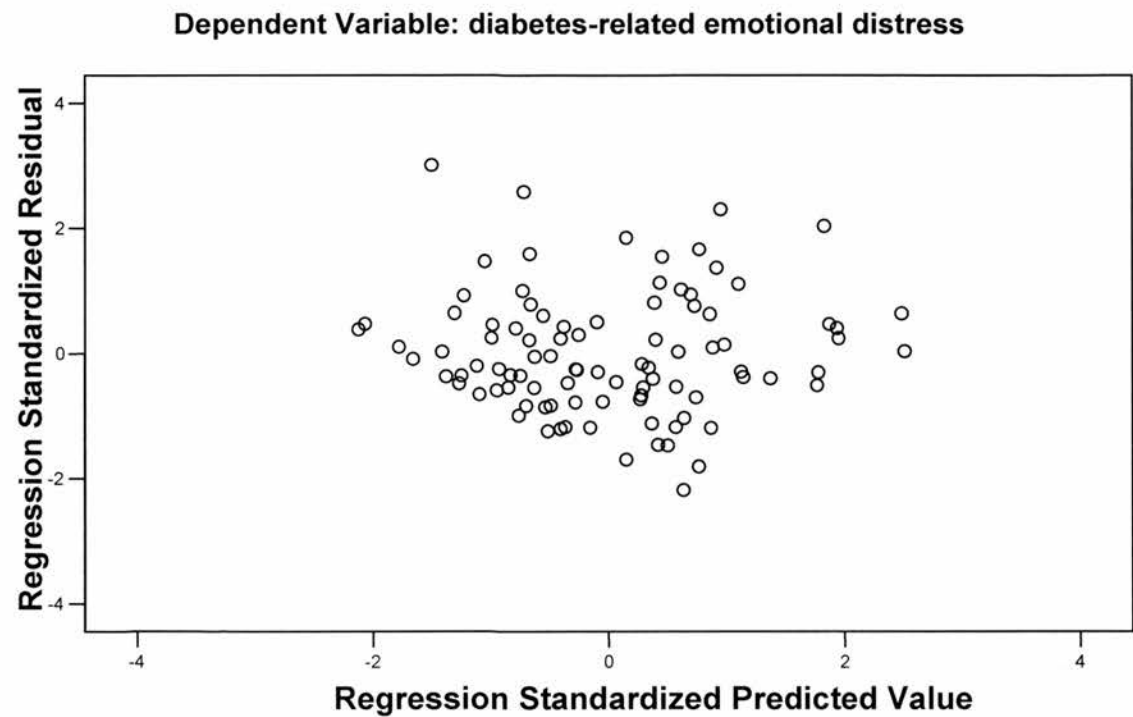


Figure 3.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs

Dependent variable: Square root of distress (*data transformed*)

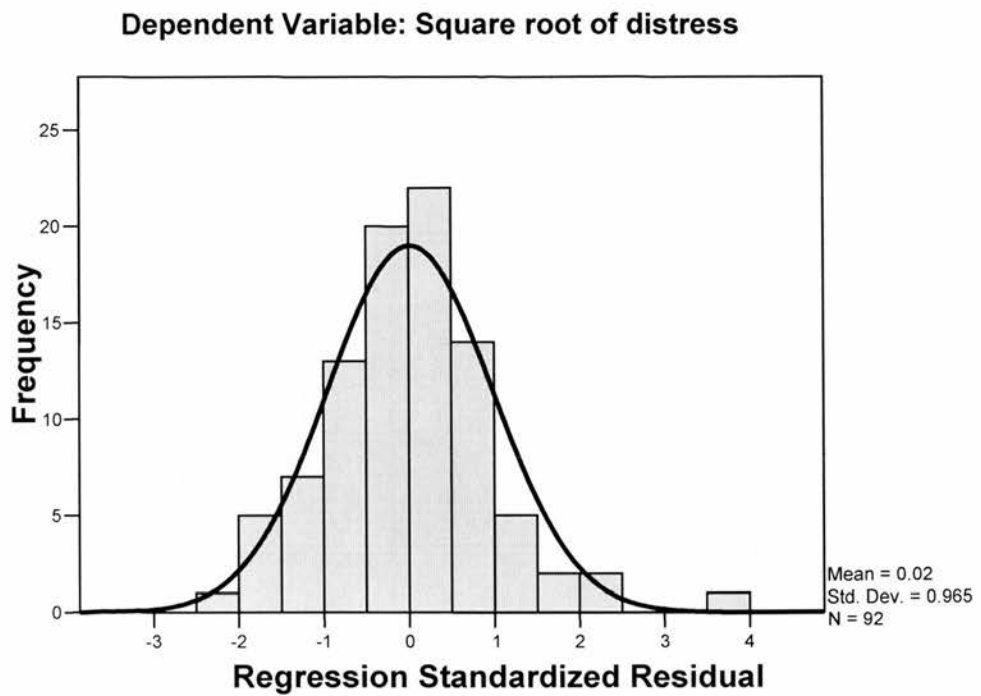


Figure 3.2 Scatterplot

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Square root of distress (*data transformed*)

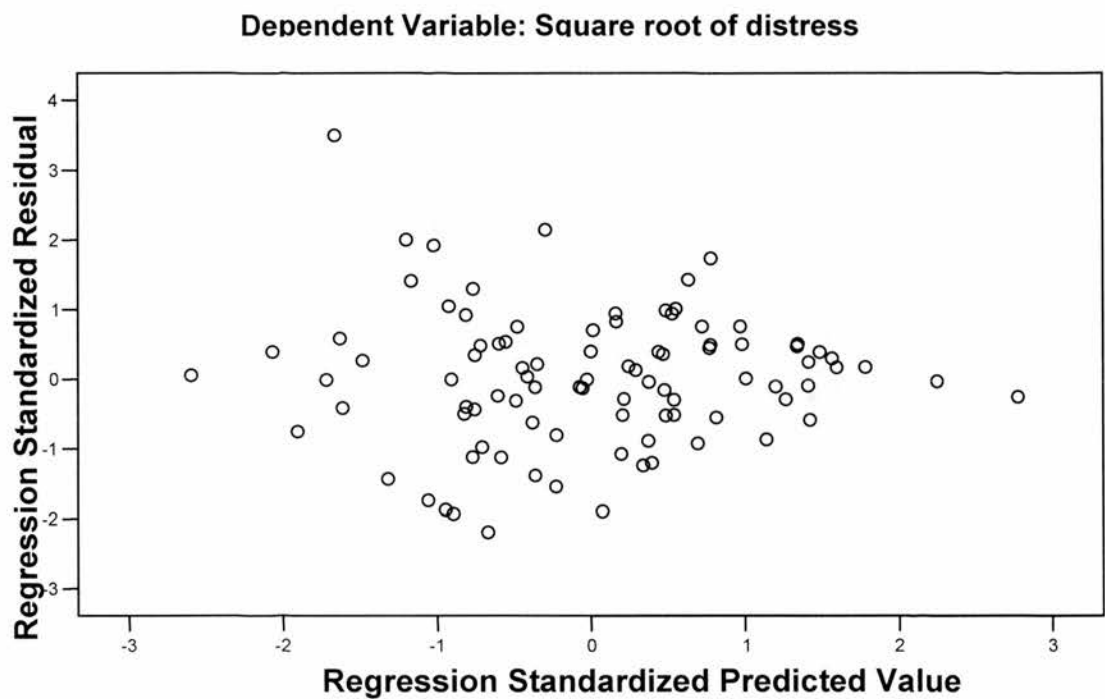


Figure 4.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Distress (*before data transformation*)

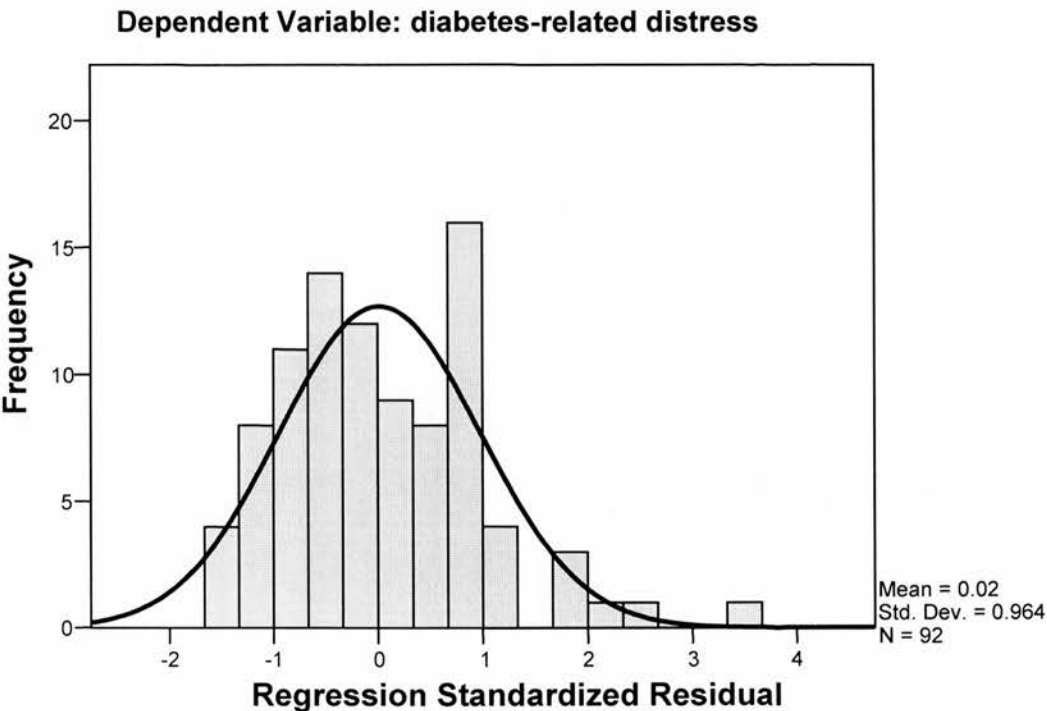


Figure 4.2 Scatterplot

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Distress (*before data transformation*)

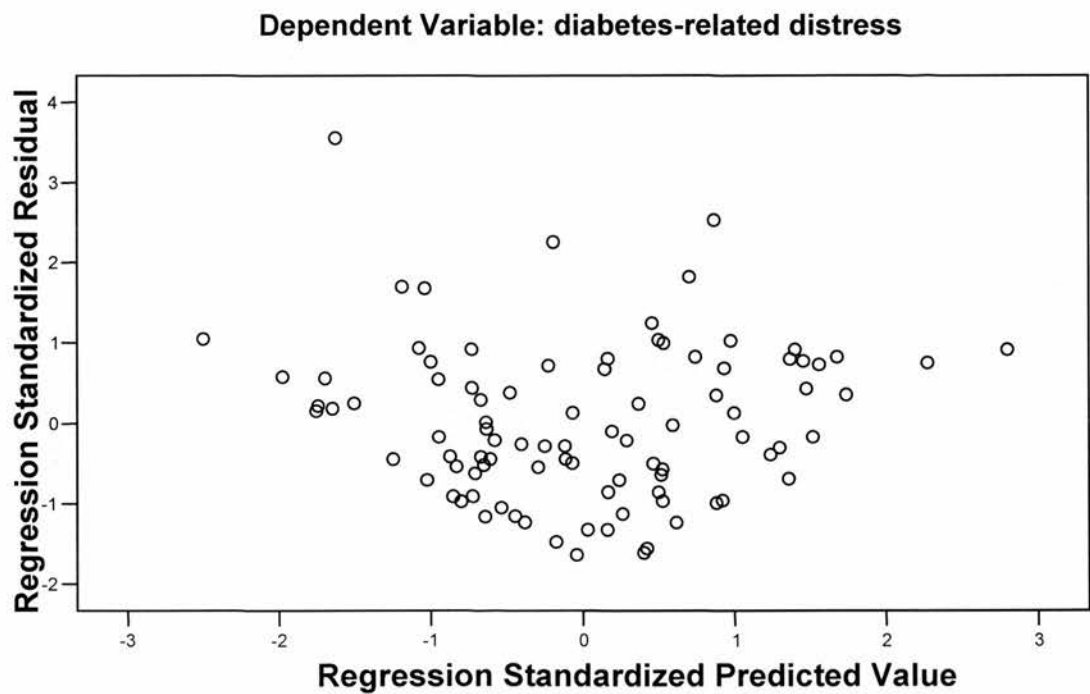


Figure 5.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Square of diet (*data transformed*)

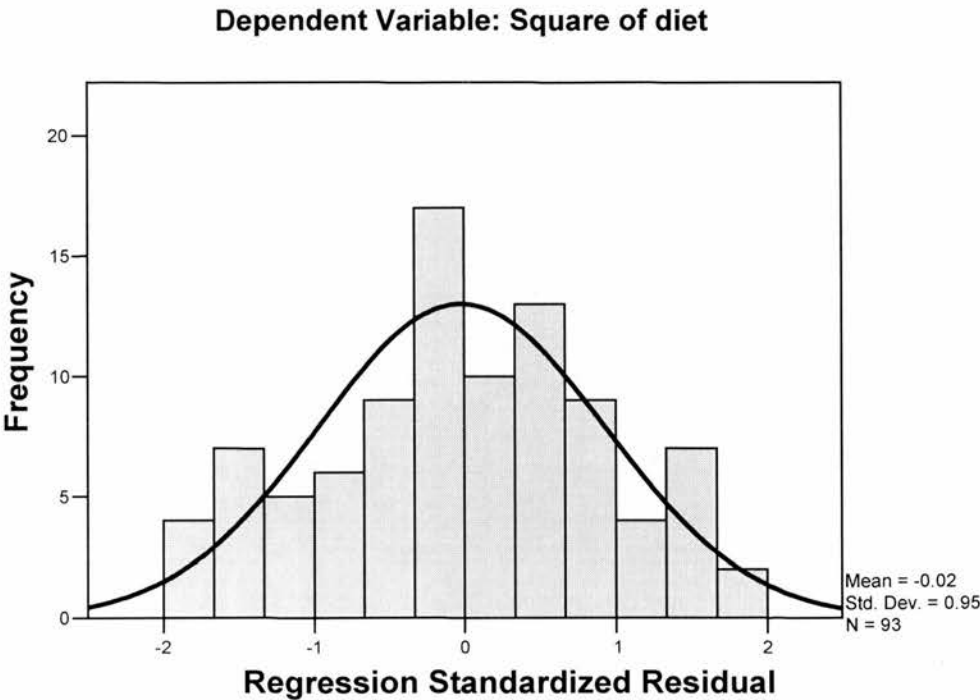


Figure 5.2 Scatterplot

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Square of diet (*data transformed*)

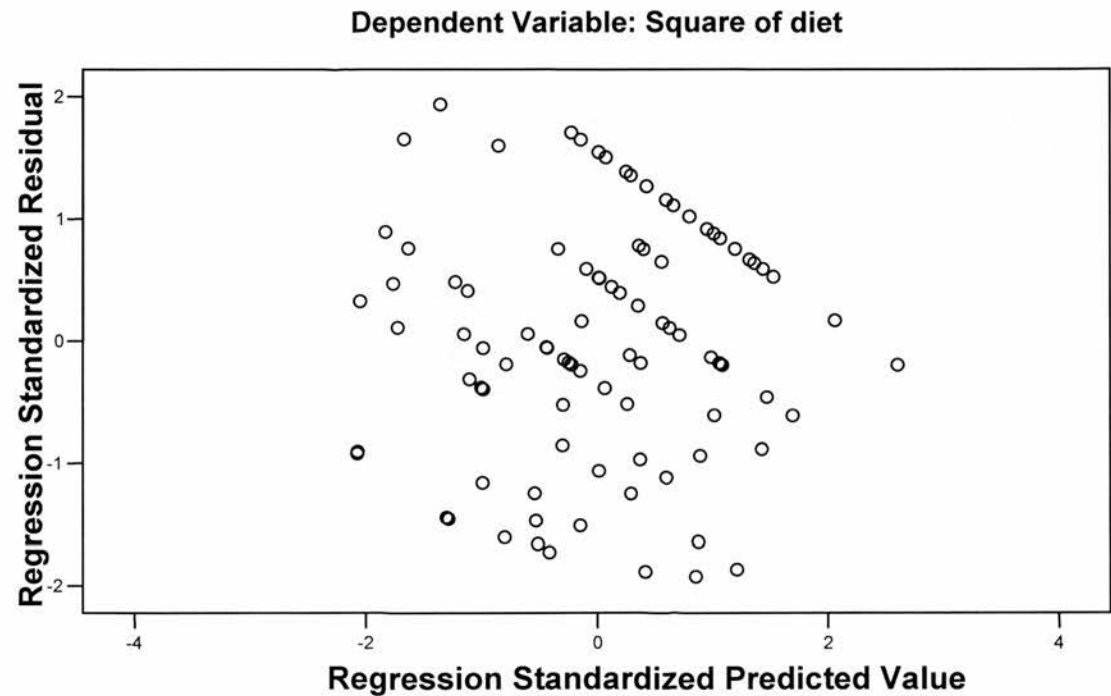


Figure 6.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Diet (*before data transformation*)

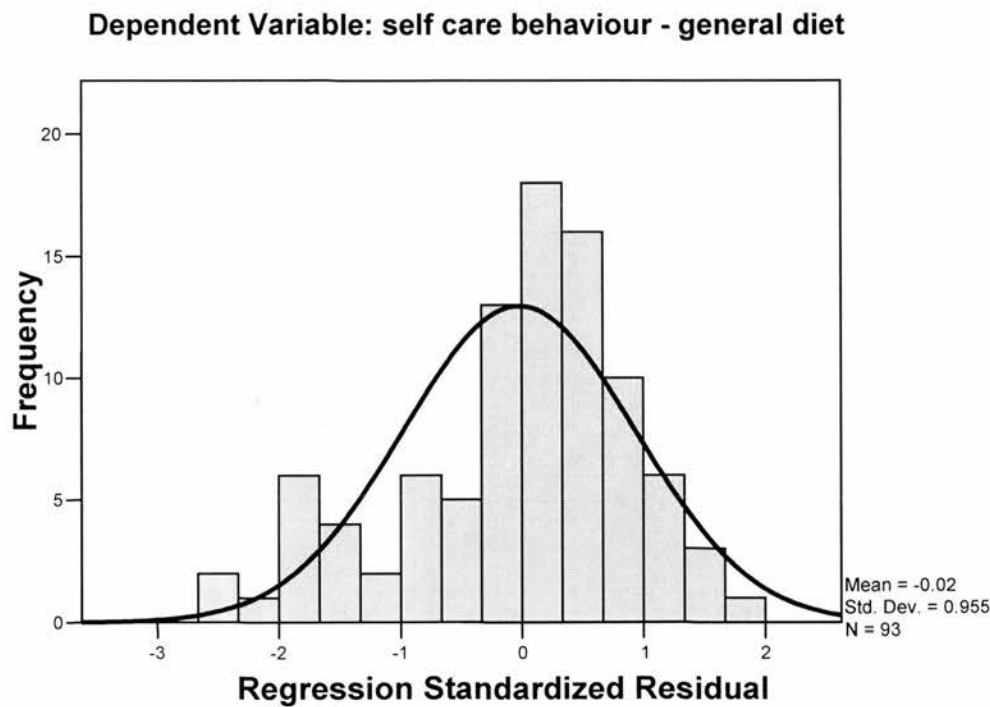


Figure 6.2 Scatterplot

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Diet (*before data transformation*)

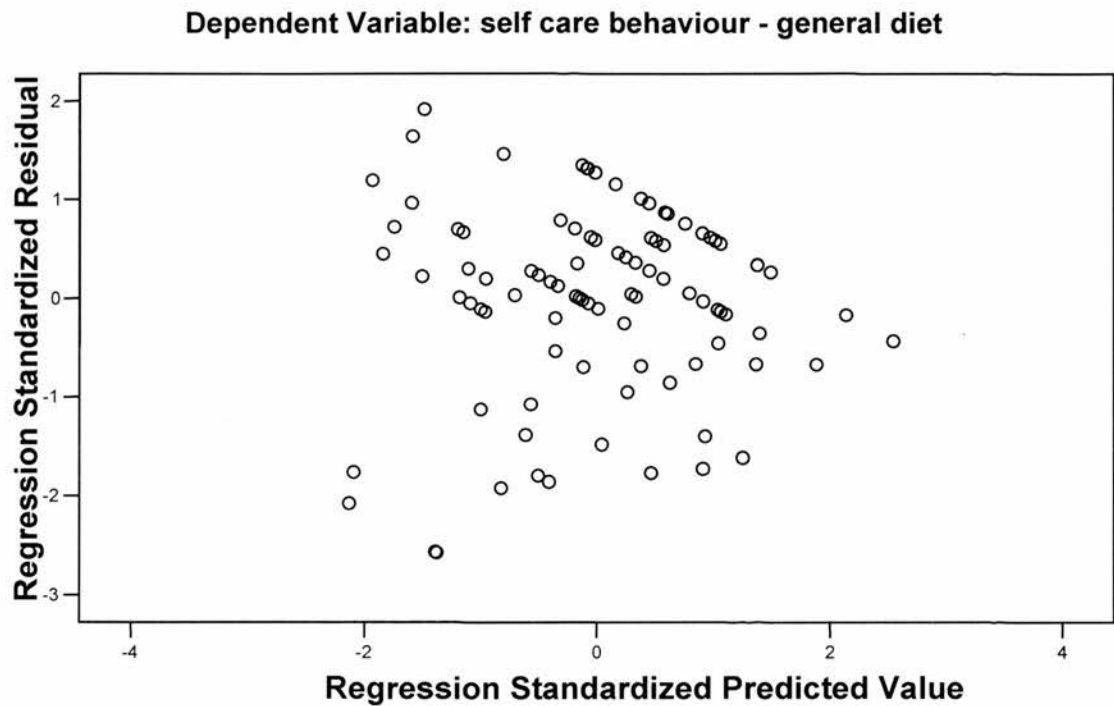


Figure 7.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Exercise

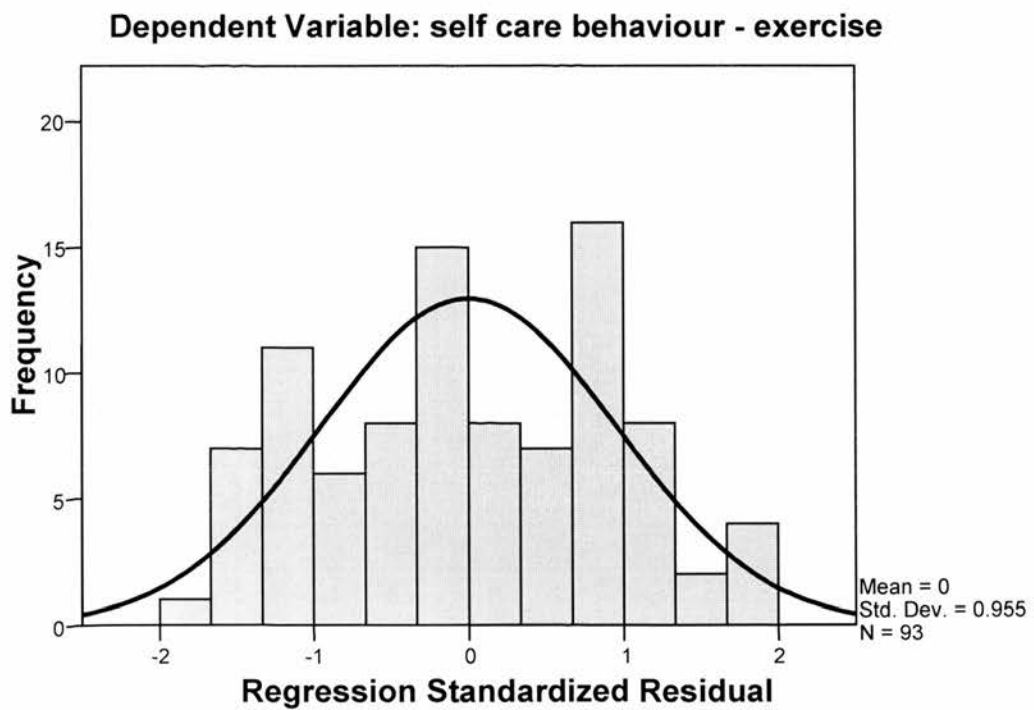


Figure 7.2 Scatterplot

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Exercise

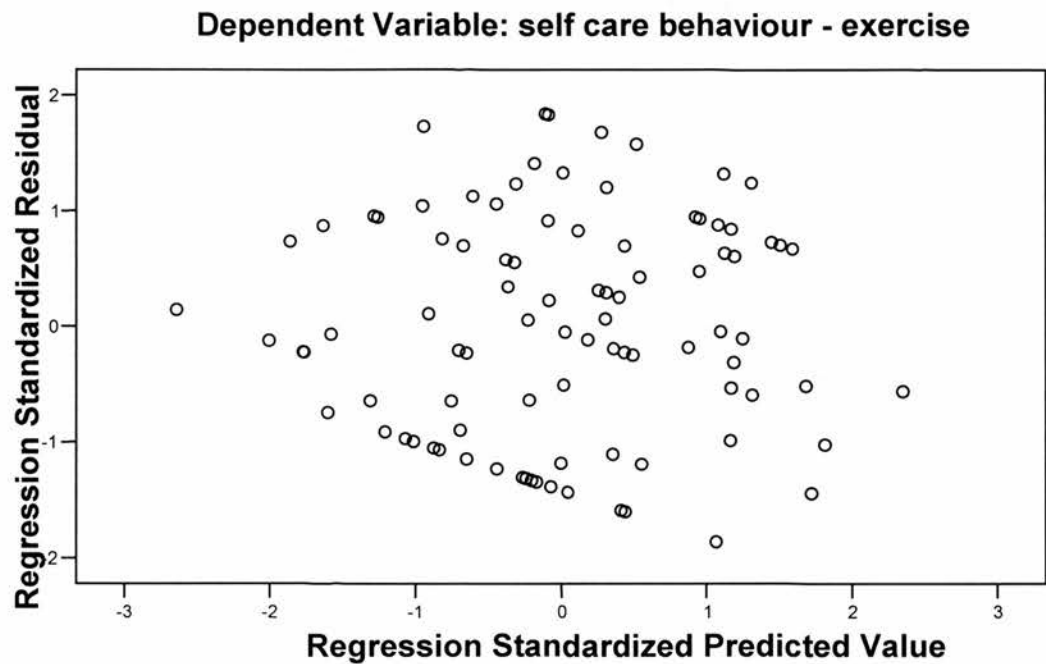


Figure 8.1 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Blood sugar monitoring

Dependent Variable: self care behaviour - blood sugar monitoring

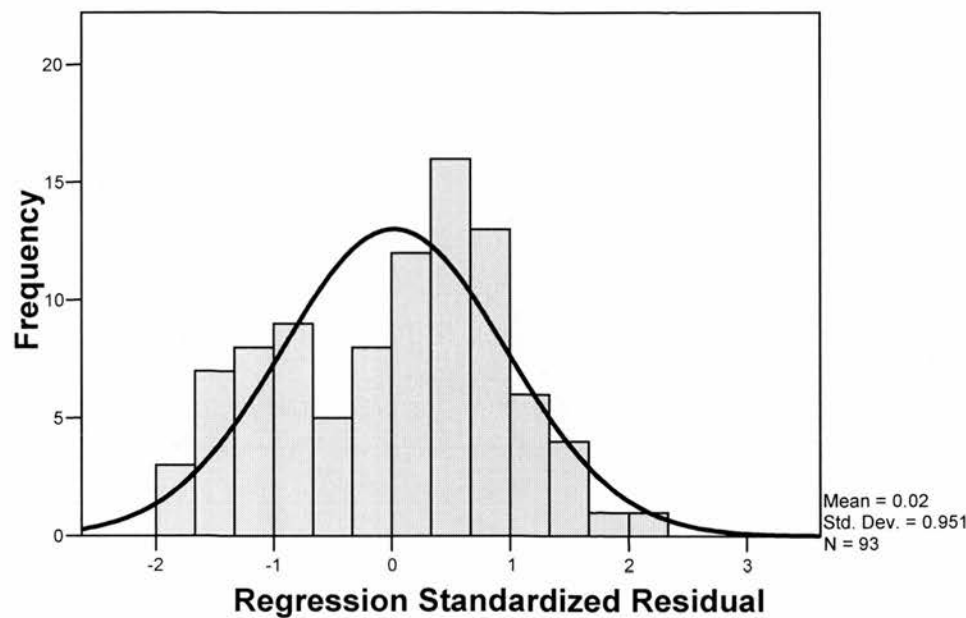


Figure 8.2 Histogram

Predictor variables: Mastery strivings v Illness beliefs
Dependent variable: Blood sugar monitoring

Scatterplot

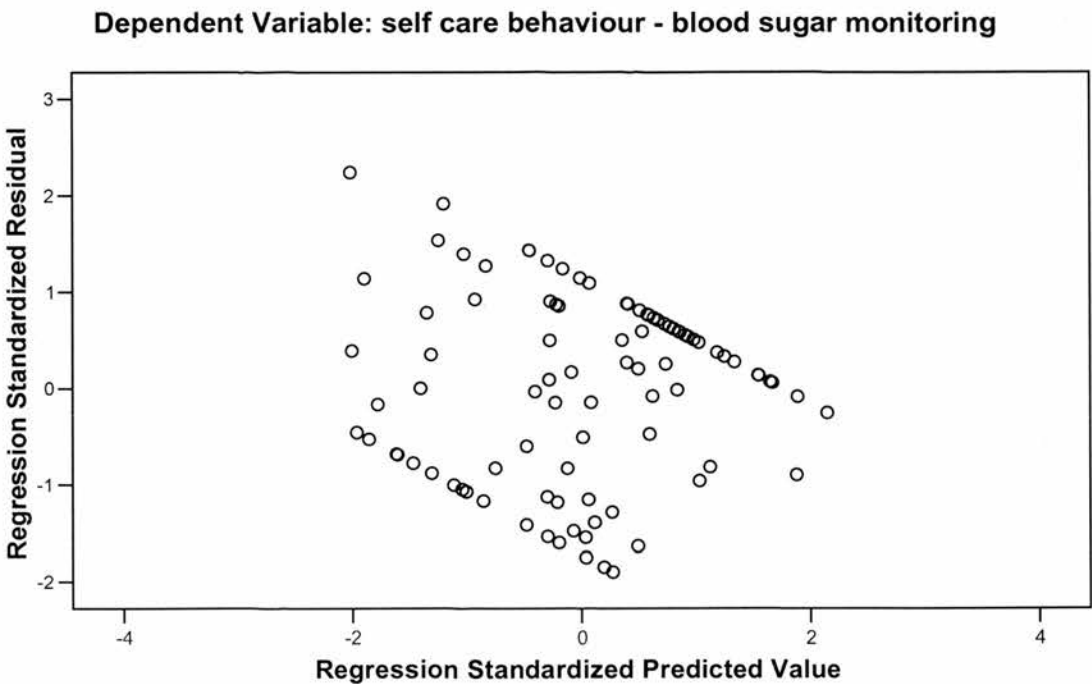


Figure 9.1 Histogram

Predictor variables: Self care v psychophysiological factors
Dependent variable: Most recent HbA1c score

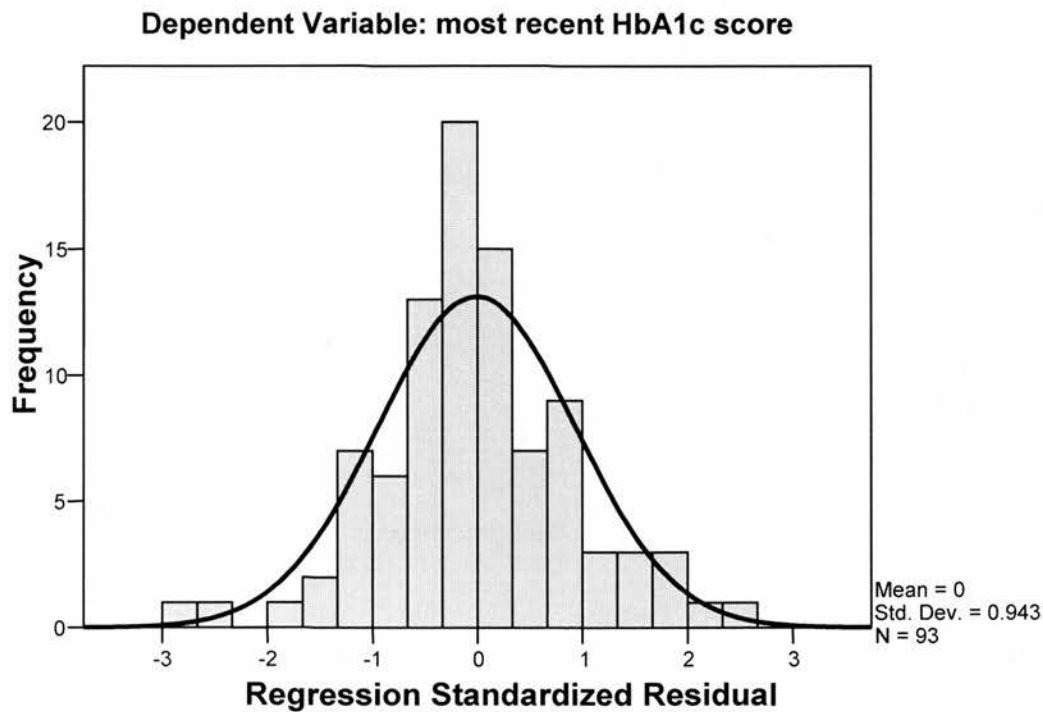


Figure 9.2 Scatterplot

Predictor variables: Self care v psychophysiological factors
Dependent variable: Most recent HbA1c score

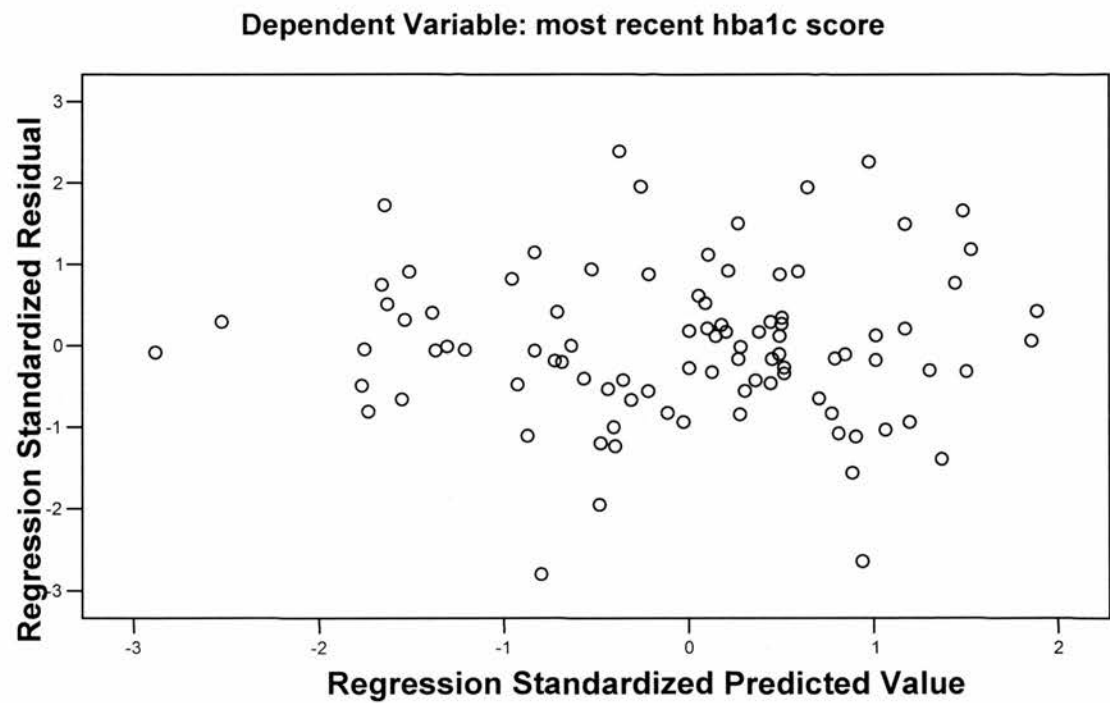


Figure 10.1 Histogram

Predictor variables: Self care v psychophysiological factors
Dependent variable: Future HbA1c score

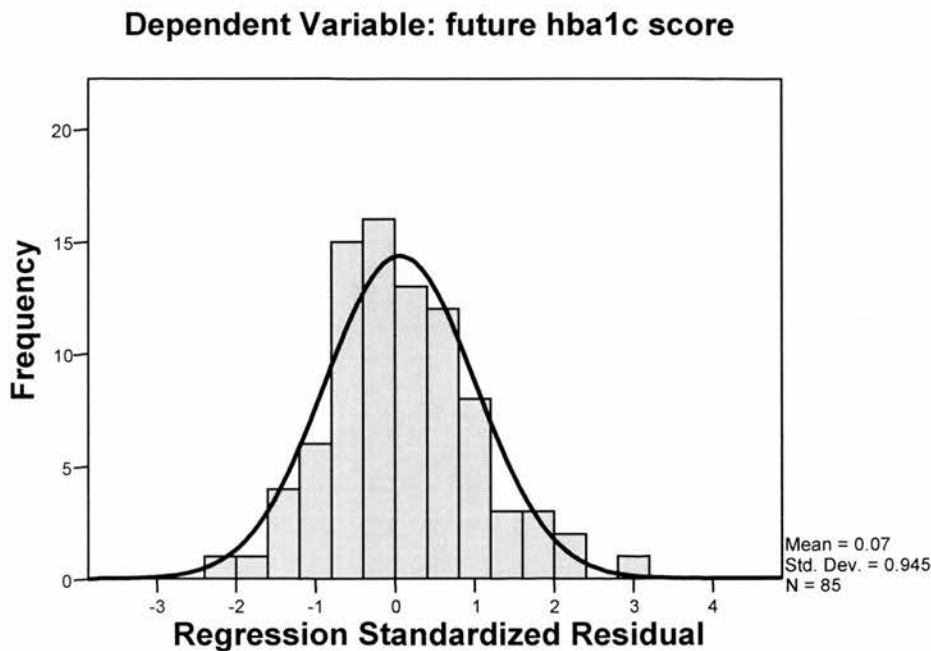
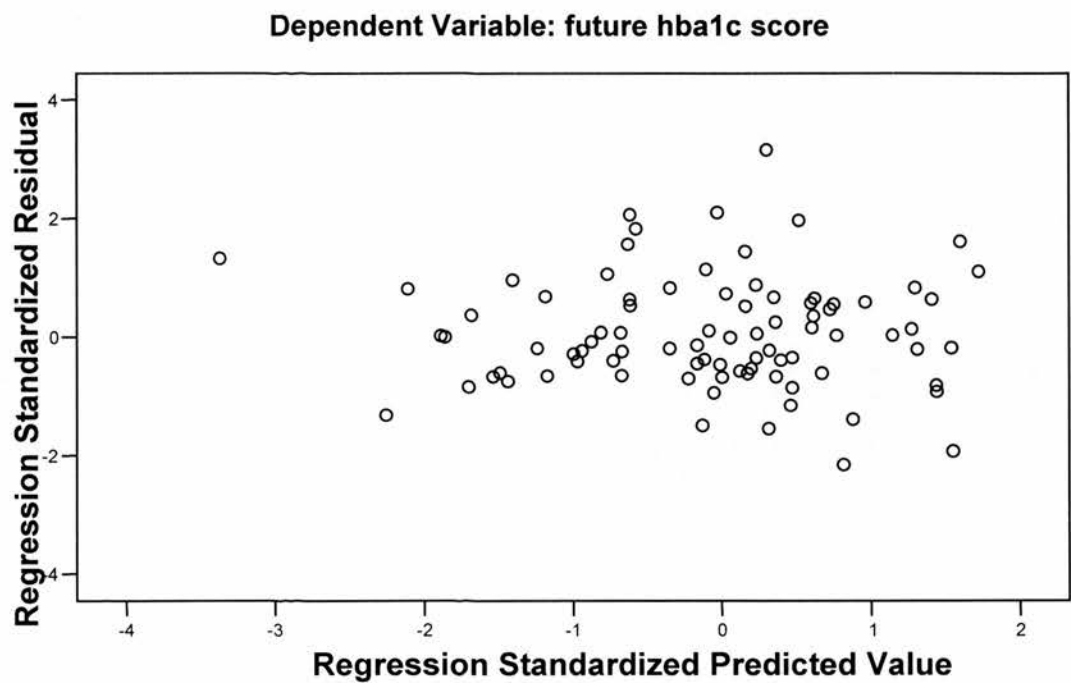


Figure 10.2 Scatterplot

Predictor variables: Self care v psychophysiological factors
Dependent variable: Future HbA1c score



APPENDIX B
RESEARCH QUESTIONNAIRES

Personal Models of Diabetes Scale

Please circle the answer that best describes how you feel:

1. How serious is your diabetes?

Not at all serious Slightly serious Fairly serious Very serious Extremely serious

2. How important is following your self care recommendations (for example, diet, exercise, and glucose testing) for controlling your diabetes?

Not all important Slightly important Fairly important Very important Extremely Important

3. How worried are you about developing complications of diabetes (like eye problems, foot ulcers, heart attacks)?

Not at all worried Slightly worried Fairly worried Very worried Extremely worried

4. How important is controlling your blood glucose level for avoiding complications from diabetes?

Not at all important Slightly important Fairly important Very important Extremely Important

5. How frustrated do you feel when trying to take care of your diabetes?

Not at all frustrated Slightly frustrated Fairly frustrated Very frustrated Extremely Frustrated

6. How much has having diabetes changed your activities (such as your family and social events, work or hobbies)?

Not at all Slightly Moderately A lot Completely

7. How much control do you feel you have over your blood glucose levels?

No control Slight control Moderate control A lot of control Complete control

For the next question, say what you believe is *important for controlling your diabetes*, which may be different from what is true for other people, or what you think the healthcare team may think. Take your own circumstances into account. Circle the number that best describes your feelings.

How **IMPORTANT** is each of the following for *controlling your diabetes*?

	<u>Probably Not Important</u>	<u>Slightly Important</u>	<u>Fairly Important</u>	<u>Moderately Important</u>	<u>Very Important</u>
a. Exercising regularly?.....1		2	3	4	5
b. Not smoking?.....1		2	3	4	5
c. Testing your blood glucose regularly?.....1		2	3	4	5
d. Recording your blood glucose results regularly?.....1		2	3	4	5
e. Checking your feet regularly?.....1		2	3	4	5
f. Following a low fat, high fibre eating plan?.....1		2	3	4	5
g. Not eating many sweets?.....1		2	3	4	5
h. Drinking little or no alcohol?.....1		2	3	4	5
i. Managing sick days as recommended?.....1		2	3	4	5
j. Making sure you get regular medical tests for diabetes-related problems (eg. Eye exams, cholesterol, blood pressure)?.....1		2	3	4	5

For the next question, say what you believe is *likely to be helpful for preventing complications of your diabetes*, which may be different from what is true for other people, or what you think the healthcare team may think. Take your own circumstances into account. Circle the number that best describes your feelings.

How **LIKELY** is each of the following to *help prevent future complications of your diabetes* (such as blindness and heart disease)?

	Probably Not Likely to Help Me	Slightly Likely to Help Me	Moderately Likely to Help Me	Fairly Likely to Help Me	Very Likely to Help Me
a. Exercising regularly?.....	1	2	3	4	5
b. Not smoking?.....	1	2	3	4	5
c. Testing your blood glucose regularly?.....	1	2	3	4	5
d. Recording your blood glucose results regularly?.....	1	2	3	4	5
e. Checking your feet regularly?.....	1	2	3	4	5
f. Following a low fat, high fibre eating plan?.....	1	2	3	4	5
g. Not eating many sweets?.....	1	2	3	4	5
h. Drinking little or no alcohol?.....	1	2	3	4	5
i. Managing sick days as recommended?.....	1	2	3	4	5
j. Making sure you get regular medical tests for diabetes-related problems (eg. Eye exams, cholesterol, blood pressure)?.....	1	2	3	4	5

Multi-Dimensional Perfectionism Scale

Please circle the number that best corresponds to your agreement with each statement below. Use this rating system: *Strongly disagree* 1 2 3 4 5 *Strongly agree*

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
1. My parents set very high standards for me.	1	2	3	4	5
2. Organization is very important to me.....	1	2	3	4	5
3. As a child, I was punished for doing things less than perfect.....	1	2	3	4	5
4. If I do not set the highest standards for myself, I am likely to end up a second rate person.....	1	2	3	4	5
5. My parents never tried to understand my mistakes.....	1	2	3	4	5
6. It is important to me that I am thoroughly competent in everything do.....	1	2	3	4	5
7. I am a neat person.....	1	2	3	4	5
8. I try to be an organised person.....	1	2	3	4	5
9. If I fail at work, I am a failure as a person....	1	2	3	4	5
10. I should be upset if I make a mistake.....	1	2	3	4	5
11. My parents wanted me to do the best at everything.....	1	2	3	4	5
12. I set higher goals than most people.....	1	2	3	4	5
13. If someone does a task at work better than I, then I feel like I failed the whole task.....	1	2	3	4	5
14. If I fail partly, it is as bad as being a complete failure.....	1	2	3	4	5
15. Only outstanding performance is good enough in my family.....	1	2	3	4	5
16. I am very good at focusing my efforts on attaining a goal.....	1	2	3	4	5
17. Even when I do something very carefully, I often feel that it is not quite right.....	1	2	3	4	5

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
18. I hate being less than the best at things.....	1	2	3	4	5
19. I have extremely high goals.....	1	2	3	4	5
20. My parents have expected excellence from me.....	1	2	3	4	5
21. People will probably think less of me if I make a mistake.....	1	2	3	4	5
22. I never felt like I could meet my parents expectations.....	1	2	3	4	5
23. If I do not do as well as other people, it means I am an inferior human being.....	1	2	3	4	5
24. Other people seem to expect lower standards than I do.....	1	2	3	4	5
25. If I do not do well all the time, people will not respect me.....	1	2	3	4	5
26. My parents have always had higher expectations for my future than I have.....	1	2	3	4	5
27. I try to be a neat person.....	1	2	3	4	5
28. I usually have doubts about the simple everyday things that I do.....	1	2	3	4	5
29. Neatness is very important to me.....	1	2	3	4	5
30. I expect higher performance in my everyday tasks than most people.....	1	2	3	4	5
31. I am an organized person.....	1	2	3	4	5
32. I tend to get behind in my work because I repeat things over and over.....	1	2	3	4	5
33. It takes me a long time to do something right.....	1	2	3	4	5
34. The fewer mistakes I make, the more people will like me.....	1	2	3	4	5
35. I never felt like I could meet my parent's standards.....	1	2	3	4	5

Framingham Type A Behaviour Pattern Measure

<i>I</i>		Very	Fairly	Some	Not at
	Traits and qualities which describe you:	Well	well	what	all
1.	being hard driving and competitive	-----	-----	-----	-----
2.	usually pressed for time	-----	-----	-----	-----
3.	being busy or dominating	-----	-----	-----	-----
4.	having a strong need to excel in most things	-----	-----	-----	-----
5.	eating too quickly	-----	-----	-----	-----

II

At the end of an average day at work, do you feel:

6.	often very pressed for time?.....	Yes	No
7.	that work stayed with you so you were thinking about it after hours?.....	Yes	No
8.	that work often stretched you to the very limits of your energy and capacity?.....	Yes	No
9.	often uncertain, uncomfortable, or dissatisfied with how well you were doing?.....	Yes	No

III

10.	Do you get upset when you have to wait for anything?.....	Yes	No
-----	--	-----	----

Emotional Control Questionnaire (ECQ4)

Name:

Sex:

Age:

Instructions : Indicate how you feel about each item by circling either "TRUE" or "FALSE". If an item is neither entirely true nor false, choose the alternative most like you. If you haven't been in the situation, please say how you feel you would behave in that situation.

- | | |
|---|------------|
| 1. I remember things that upset me or make me angry for a long time afterwards. | TRUE FALSE |
| 2. I don't bear a grudge - when something is over, it's over, and I don't think about it again. | TRUE FALSE |
| 3. When someone upsets me, I try to hide my feelings. | TRUE FALSE |
| 4. Some people need somebody to confide in but I prefer to solve my own problems. | TRUE FALSE |
| 5. I get worked up just thinking about things that have upset me in the past. | TRUE FALSE |
| 6. I often find myself thinking over and over about things that make me angry. | TRUE FALSE |
| 7. Even when I feel upset about something I don't feel the need to talk to anyone about it. | TRUE FALSE |
| 8. People find it difficult to tell whether I'm excited about something or not. | TRUE FALSE |
| 9. I like to talk problems over to get them off my chest. | TRUE FALSE |
| 10. I feel vulnerable if I have to ask other people for help. | TRUE FALSE |
| 11. In the past I have found a problem easier to solve if I have talked it over with someone. | TRUE FALSE |
| 12. It is good to hear problems out loud. | TRUE FALSE |
| 13. If I receive bad news in front of others I usually try to hide how I feel. | TRUE FALSE |
| 14. It helps to discuss a problem even if it is impossible to reach a solution. | TRUE FALSE |
| 15. I seldom get preoccupied with worries about my future. | TRUE FALSE |
| 16. I have friends who I know would help me but I find it difficult to ask. | TRUE FALSE |
| 17. I seldom show how I feel about things. | TRUE FALSE |
| 18. If I see something that frightens or upsets me, it stays in my mind for a long time afterwards. | TRUE FALSE |
| 19. I think people show their feelings too easily. | TRUE FALSE |
| 20. My failures give me a persistent feeling of remorse. | TRUE FALSE |
| 21. When something upsets me I prefer to talk to someone about it than to bottle it up. | TRUE FALSE |
| 22. For me, the future seems to be full of troubles and problems. | TRUE FALSE |
| 23. There are some situations in which I am unable to confide in anybody. | TRUE FALSE |
| 24. I often feel as if I'm just waiting for something bad to happen. | TRUE FALSE |
| 25. When I am reminded of my past failures, I feel as if they are happening all over again. | TRUE FALSE |
| 26. If I get angry or upset I usually say how I feel. | TRUE FALSE |

27. Sometimes I have to force myself to concentrate on something else to keep distressing thoughts about the future out of my mind.	TRUE FALSE
28. Intrusive thoughts about problems I'm going to have to deal with make it difficult for me to keep my mind on a task.	TRUE FALSE
29. I don't feel embarrassed about expressing my feelings.	TRUE FALSE
30. I don't let a lot of unimportant things irritate me.	TRUE FALSE
31. I wish I could banish from my mind the memories of past failures.	TRUE FALSE
32. I am unable to trust anybody with my problems.	TRUE FALSE
33. I am afraid that if I confide in someone they will tell my problems to others.	TRUE FALSE
34. I never get so involved thinking about upsetting things that I am unable to feel positive about the future.	TRUE FALSE
35. I am not afraid to ask somebody for help.	TRUE FALSE
36. I worry less about what might happen than most people I know.	TRUE FALSE
37. It takes me a comparatively short time to get over unpleasant events.	TRUE FALSE
38. Sometimes I am unable to confide even in someone who is close to me.	TRUE FALSE
39. Any reminder about upsetting things brings all the emotion flooding back.	TRUE FALSE

Coping Style Questionnaire (CSQ-3)

Name:

Age:

Sex:

Instructions: Although people may react in different ways to different situations, we all tend to have a characteristic way of dealing with things which upset us. How would you describe the way you typically react to stress? Circle **Always (A)**, **Often (O)**, **Sometimes (S)**, or **Never (N)** for each item below:

- | | | | | |
|--|---|---|---|---|
| 1. Feel overpowered and at the mercy of the situation. | A | O | S | N |
| 2. Work out a plan for dealing with what has happened. | A | O | S | N |
| 3. See the situation for what it actually is and nothing more. | A | O | S | N |
| 4. Become miserable or depressed. | A | O | S | N |
| 5. Feel that no-one understands. | A | O | S | N |
| 6. Do not see the problem or situation as a threat. | A | O | S | N |
| 7. Feel that you are lonely or isolated. | A | O | S | N |
| 8. Take action to change things. | A | O | S | N |
| 9. Feel helpless - there's nothing you can do about it. | A | O | S | N |
| 10. Try to find out more information to help make a decision about things. | A | O | S | N |
| 11. Keep things to myself and not let others know how bad things are. | A | O | S | N |
| 12. Feel independent of the circumstances. | A | O | S | N |
| 13. Sit tight and hope it all goes away. | A | O | S | N |
| 14. Take my frustrations out on the people closest to me. | A | O | S | N |
| 15. Resolve the issue by not becoming identified with it. | A | O | S | N |
| 16. Respond neutrally to the problem. | A | O | S | N |
| 17. Pretend there's nothing the matter, even if people ask. | A | O | S | N |
| 18. Get things into proportion - nothing is really that important. | A | O | S | N |
| 19. Believe that time will somehow sort things out. | A | O | S | N |
| 20. Feel completely clear-headed about the whole thing. | A | O | S | N |

21.	Try to keep a sense of humour - laugh at myself or the situation.	A	O	S	N
22.	Keep thinking it over in the hope that it will go away.	A	O	S	N
23.	Believe that I can cope with most things with the minimum of fuss.	A	O	S	N
24.	Daydream about things getting better in future.	A	O	S	N
25.	Try to find a logical way of explaining the problem.	A	O	S	N
26.	Decide it's useless to get upset and just get on with things.	A	O	S	N
27.	Feel worthless and unimportant.	A	O	S	N
28.	Trust in fate - that things will somehow work out for the best.	A	O	S	N
29.	Use my past experience to try to deal with the situation.	A	O	S	N
30.	Try to forget the whole thing has happened.	A	O	S	N
31.	Become irritable or angry.	A	O	S	N
32.	Just give the situation my full attention.	A	O	S	N
33.	Just take one step at a time.	A	O	S	N
34.	Criticise or blame myself.	A	O	S	N
35.	Pray that things will just change.	A	O	S	N
36.	Think or talk about the problem as if it did not belong to me.	A	O	S	N
37.	Talk about it as little as possible.	A	O	S	N
38.	Prepare myself for the worst possible outcome.	A	O	S	N
39.	Look for sympathy from people.	A	O	S	N
40.	See the thing as a challenge that must be met.	A	O	S	N
41.	Be realistic in my approach to the situation.	A	O	S	N

SUMMARY OF DIABETES SELFCARE-ACTIVITIES (2)

The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick. Please answer the questions as honestly and accurately as you can. Your responses will be confidential.

DIET

1. How many of the last SEVEN DAYS have you followed a healthful eating plan?

0 1 2 3 4 5 6 7

2. On average, over the past month, how many DAYS PERWEEK have you followed your eating plan?

0 1 2 3 4 5 6 7

3. On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?

0 1 2 3 4 5 6 7

4. On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?

0 1 2 3 4 5 6 7

EXERCISE

5. On how many of the last SEVEN DAYS, did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking).

0 1 2 3 4 5 6 7

6. On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?

0 1 2 3 4 5 6 7

BLOOD SUGAR TESTING

7. On how many of the last SEVEN DAYS did you test your blood sugar?

0 1 2 3 4 5 6 7

8. On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health care provider?

0 1 2 3 4 5 6 7

FOOT CARE

9. On how many of the last SEVEN DAYS did you check your feet?

0 1 2 3 4 5 6 7

10. On how many of the last SEVEN DAYS did you inspect the inside of your shoes?

0 1 2 3 4 5 6 7

SMOKING

11. Have you smoked a cigarette – even one puff – during the past SEVEN DAYS?

0. No

1. Yes. If yes, how many cigarettes did you smoke on an average day?

2. Number of cigarettes: _____

Problem Areas in Diabetes (PAID) Questionnaire

INSTRUCTIONS: Which of the following diabetes issues are currently a problem for you?

Circle the number that gives the best answer for you.

Please provide an answer for each question.

	Not a problem	Minor problem	Moderate problem	Somewhat serious problem	Serious problem
1. Not having clear and concrete goals for your diabetes care?.....	0	1	2	3	4
2. Feeling discouraged with your diabetes treatment plan?.....	0	1	2	3	4
3. Feeling scared when you think of living with diabetes?.....	0	1	2	3	4
4. Uncomfortable social situations related to your diabetes care?.....	0	1	2	3	4
5. Feelings of deprivation regarding food and meals?.....	0	1	2	3	4
6. Feeling depressed when you think about living with diabetes?.....	0	1	2	3	4
7. Not knowing if your mood or feelings are related to your diabetes?.....	0	1	2	3	4
8. Feeling overwhelmed by your diabetes?.....	0	1	2	3	4
9. Worrying about low blood sugar reactions?.....	0	1	2	3	4
10. Feeling angry when you think about living with diabetes?.....	0	1	2	3	4
11. Feeling constantly concerned about food and eating?.....	0	1	2	3	4
12. Worrying about the future and the possibility of serious complications?.....	0	1	2	3	4
13. Feelings of guilt or anxiety when you get off track with your diabetes?.....	0	1	2	3	4
14. Not 'accepting' your diabetes?.....	0	1	2	3	4
15. Feeling unsatisfied with the service you are receiving?.....	0	1	2	3	4
16. Feeling that diabetes is taking up too much of your mental and physical energy every day?.....	0	1	2	3	4
17. Feeling alone with your diabetes?.....	0	1	2	3	4
18. Feeling that your friends and family are not supportive of your diabetes management efforts?.....	0	1	2	3	4

	Not a problem	Minor problem	Moderate problem	Somewhat serious problem	Serious problem
19. Coping with the complications of diabetes?..0		1	2	3	4
20. Feeling 'burned out' by the constant effort needed to manage diabetes?.....0		1	2	3	4

APPENDIX C
DEMOGRAPHIC DATA SHEET

DEMOGRAPHIC DATA SHEET

Name.....

Address.....

.....

Date of birth..... Age

Gender.....

Married/single etc.....

Number, age, & gender of any children.....

Who lives at home.....

Type of diabetes (insulin or noninsulin dependent).....

Duration of diabetes.....Age when diagnosed.....

Current treatment regime.....
(Insulin/tablets/both/neither)

Previous treatment regime.....

Time between diagnosis & treatment with insulin.....
(if currently on insulin)

No. of daily insulin injections/tablets.....

Who takes responsibility for managing
your diabetes (*you, your partner, someone else*)?.....

Any additional major illnesses/medical complications.....

.....

Current occupation(Full/Part time).....

Educational Level Attained
(*Primary/secondary/vocational/college/university*).....

Age when finished education.....

Most recent Diabetes Clinic attendance.....

Date of next Diabetes Clinic Attendance.....

* In agreeing to participate, I also consent to my hbA1c scores being accessed from my medical file for the purposes of this research project.

Signed.....Date.....

APPENDIX D
CODING INFORMATION

CODING INFORMATION

Full Variable Name	SPSS Variable Name	SPSS Variable Label	Coding Instructions
Id	id	id	Identification number
Age	age	age	In years
Gender	gender	gender	1=males, 2=female
Duration of Diabetes	diabet.dur	duration of diabetes (years)	In years
Diabetes Type	diab.typ	type of Diabetes	1= Type 1, 2=Type 2
Medical Complications	illness	additional medical Complications	1= major complications & functional limitations 0=no complications
Employment Status	work	employment status	1= employed, 0=not employed
Living Arrangement	live.arr	living arrangements	1=living alone, 0=living with family member
Marital Status	mar.stat	married/ Single	1=married, cohabiting 0 single/Widowed
Years in Education	educat	years in education	In years
Insulin Dependence	ins.dep	insulin dependence	1=Insulin depend., 2=noninsulin depend.